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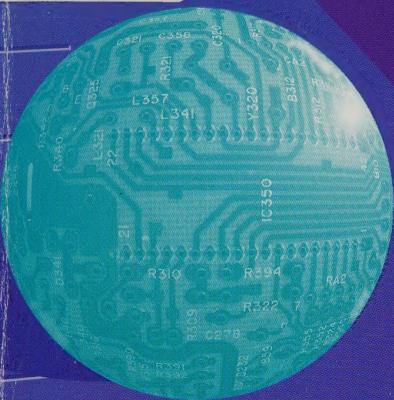
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The Evolving Workplace

Findings from the Pilot Workplace and Employee Survey

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The Evolving Workplace: Findings from the Pilot Workplace and Employee Survey

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Foreword

As our economy changes, so does the world of work. The strategies and decisions of employers are developed within a constantly-changing external framework, related to increasing technological change, international competition, and changing macro-economic conditions. Changing strategies and organizational change within companies are not well understood, but they do have a broad impact on Canada's economy and a direct one on Canada's workers. The "Workplace and Employee Survey" (WES) is our joint effort to better understand both changes taking place in establishments, and their impact. It is an ambitious undertaking, and this overview report marks the end of an important first step, the pilot stage. As many new questions are posed as old ones answered. But the richness of the data underscores the richness of change itself, and its potential impact on the well-being of Canadians.

We are happy to provide, in this report, an overview of some of the basic findings from the pilot survey. The content in the WES is extensive, and not all subject matter areas can be covered here. This report presents a preview of the kinds of evidence we will bring to bear on important employment and workplace issues in future research reports based on the pilot data, and eventually on the data collected from the full-scale, longitudinal survey planned for the future. This pilot will help make the future production survey and the related research a success. We look forward to sharing future results with you.

Ivan P. Fellegi
Chief Statistician
Statistics Canada

Mel Cappe
Deputy Minister
Human Resources Development Canada

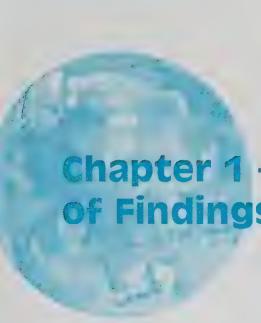
Cautionary Note on the Preliminary Nature of the Findings

The results reported here are from a pilot survey. Because it was a pilot, the sample was small (approximately 750 establishments and 2,000 workers), and represented particular industries in particular provinces. Therefore, the data are not representative of the entire Canadian economy; they are representative of particular industry/province combinations. Because of this and given the small sample, we consider the results reported here to be preliminary. One can think of this project as a series of case studies, where the cases represent particular industries in particular provinces. As with all case studies, the results are not generalizable to the entire Canadian economy, but do provide important evidence on a number of issues about which we currently know very little. The findings will be re-examined and generalized to the entire economy once the first wave of the longitudinal production version of the survey is conducted in early 1999.

Explanation of Table Symbols

The symbol “..” represents estimates with a coefficient of variation greater than 33 percent.

Estimates with a coefficient in the range of 25.1 to 33.4 percent are published with a cautionary asterisk (*), denoting their relatively high variability.



Chapter 1 — Discussion and Summary of Findings

Garnett Picot

This overview report provides the first data from a new pilot survey recently conducted by Statistics Canada for Human Resources Development Canada. This survey, called the “Workplace and Employee Survey” (WES) and developed jointly by the two agencies,¹ represents the first attempt in Canada at conducting a large-scale linked employer-employee survey.² The survey consists of two components: (1) an establishment survey on the adoption of technologies, organizational change, training and other human resource practices, business strategies, and labour turnover in establishments; and (2) a survey of workers within these same establishments to obtain data on their wages, hours of work, job type, human capital, other characteristics, use of technologies, and training taken. This data source provides, for the first time in Canada, detailed linked micro-data on establishments and their workers.

Why Have a Linked Workplace and Employee Survey?

Advanced economies are constantly evolving. There is a general sense that the pace of change has accelerated in recent years, and that we are moving in new directions. This evolution is captured in phrases such as “the knowledge-based economy” or “the information economy.” Central to these notions is the role of technology, particularly information technology. The implementation of these technologies is thought to have substantial impact on both firms and their workers.

Also central to this economic evolution are globalization and the influence of increasing international competition. These changes are thought to have a significant impact on firms and workers. The apparently rising level of competition is seen to lead to the adoption of new technologies, downsizing, re-engineering, increased “numerical flexibility”,³ and other organizational changes.

1 Notable participants were the Applied Research Branch at Human Resources Development Canada and the Business and Labour Market Analysis Division and Labour Division at Statistics Canada.

2 Some smaller-scale surveys, such as that conducted by L. Osberg and his colleagues in the economics department at Dalhousie University, have been conducted in the past.

3 Numerical flexibility refers to practices where firms contract out and make greater use of temporary or part-time workers to improve flexibility in their workforces.

Finally, most of the change associated with “the move to the knowledge-based economy” has implications for human resource development policies. Increasingly, human resources are seen to be the life-blood of a growing economy, along with technological advancement. This view has led to calls for greater attention to the management and development of human resources. Education and training are increasingly seen as a central policy prescription for improved prosperity.

In this evolving environment, firms are thought to have undergone dramatic change in the areas of technology adoption, organizational change, training patterns, business strategies, levels of competition, and the manner in which they engage labour. Workers, on the other hand, experience this evolution through changes in job creation rates, job stability, wages and wage inequality, training, the use of advanced technologies, and the type of employment contracts available.

Due to a well-developed set of household (worker) surveys, we in Canada have a good understanding of workers’ outcomes regarding wages and wage inequality, job stability and layoffs, training, job creation, and unemployment. What is missing on the employees’ side is the ability to link these changes to events taking place in firms. Such a connection is necessary if we hope to understand the association between labour market changes and demand-side pressures, which stem from global competition, technological change, and the drive to improve human capital, among other things. Thus, one primary goal of the WES is to establish a link between events occurring in establishments and the outcomes for workers.

The second goal of the survey is to develop a better understanding of what is indeed occurring in companies in an era of substantial evolution. Just how many companies have implemented new information technologies? On what scale? What kind of training is associated with this? What type of organizational change is occurring in firms? On what types of business strategies are firms relying to thrive during this period of change, and do they vary dramatically across firms? How important are human resource development activities and strategies? Are they largely ignored by most establishments? Do firms that adopt one set of strategies in fact adopt many (e.g., adoption of technologies, innovation, human resource development, organizational changes)? Is there a set of “high-performance” workplaces that tend to move on many fronts? These are the kinds of issues addressed in the WES.

While the available household surveys inform us about significant labour market changes, there is not a corresponding set of establishment surveys that deals with new concerns. Some limited survey work has been done. The WES is an attempt to extend this in the context of a general worker-workplace survey. Hence, there are two principal objectives:

1. to provide new information on events occurring in establishments and firms; and
2. to link this information to data on workers to determine the association between events occurring in establishments and worker outcomes, controlling for worker human capital and background.

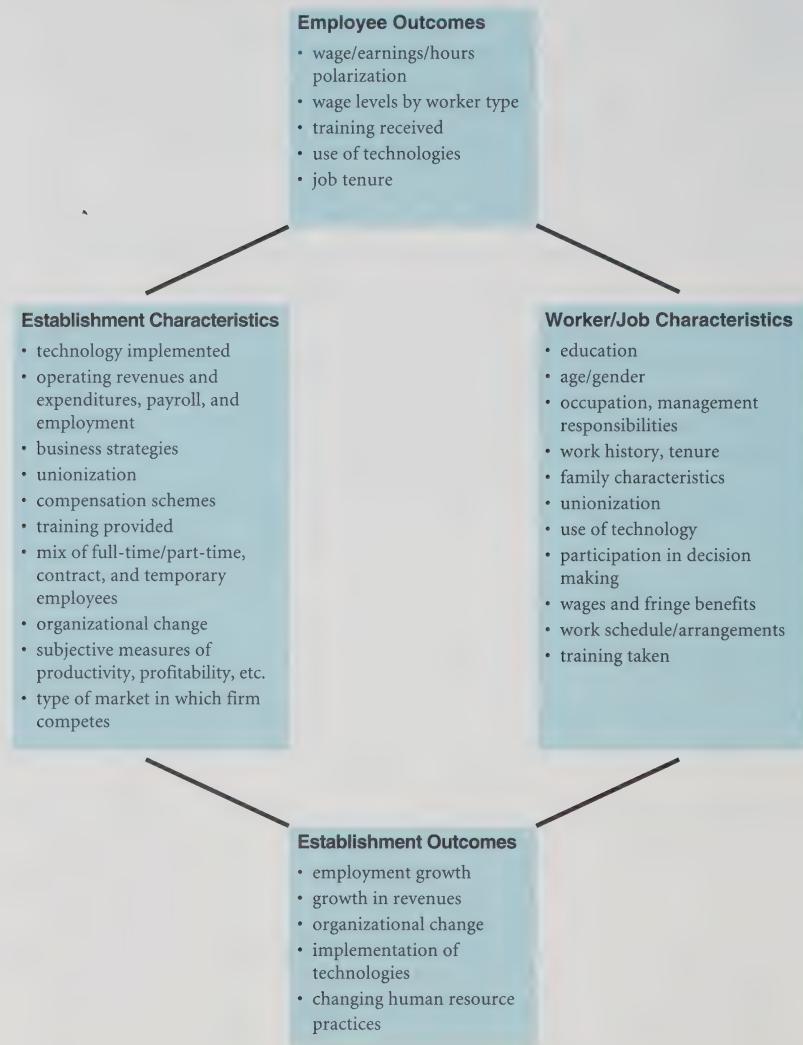
The advantage of a linked survey is depicted in Chart 1, which displays the main content blocks in the two surveys. Note that there is reference to establishment and worker outcomes. There is limited data in the WES on establishment outcomes (adoption of technology, training, operating revenues and expenditures, labour turnover, etc.). Analysis of these events can be informed not only by the characteristics of the establishment, as has been done in other firm surveys, but also by the characteristics of the workers. Similarly, worker outcomes can be informed not only by data on the workers themselves, as has always been the case, but also by new establishment data. In essence, events on both the supply and demand side of the labour market can be brought to bear on the issues of interest.

Finally, the WES should be thought of as extending surveying infrastructure. The contents will likely change significantly over the next few years as we learn more about what is and what is not important. This infrastructure will allow new content development.

The focus of this overview report is on the first objective: providing basic information on establishments. Some use of the linked data is made in this report, but more extensive analyses of the association between establishment characteristics and worker outcomes is left to a series of forthcoming research papers.



Chart 1: Workplace Activities and Human Capital Characteristics Potentially Influencing Employee and Establishment Outcomes



The Pilot Survey

This pilot survey — which will be followed by a full-scale production survey scheduled for early 1999 — really comprises two surveys: a survey of *establishments*⁴ conducted by personal interview, and a telephone survey of *workers* in the sampled establishments. The process of mounting the survey was quite complex and is beyond the scope of this chapter. For a more complete discussion of the pilot methodology, see Krebs, Patak and Wannell (1997).⁵ The detailed questionnaires are available from the WES project team,⁶ and a summary of the content is set out in Chart 1. In larger establishments there were often multiple respondents. The first point of contact was the human resources manager, or the person who performed this function for the establishment. This contact then forwarded the portion of the questionnaire dealing with topics such as business strategies or adoption of technology to others in the establishment or company who could respond for that establishment. The employer provided the interviewer with a list of workers in the establishment, and a random sample of between two and six employees was selected, depending upon the size of the establishment. In the 1999 production survey the range in sample size will be increased to between two and twenty, depending upon establishment size.

The final pilot sample included 748 establishments and 1,960 workers. These numbers are sufficient to produce *preliminary* results. It is important for readers to understand that *the results of the pilot are not representative of all establishments and workers in the economy*. Particular industry/province combinations were selected for the pilot. These are provided in Table 1.1 below. While these results apply only to the particular industry/province combinations noted, the industries selected do cover the major sectors of the economy. The results reported are, in a sense, case study results. They inform us about particular cases (here industry/province cases), but they cannot necessarily be mapped to the economy as a whole. Results representative of the economy will have to await the production survey, which is intended to sample up to 7,500 establishments and 40,000 workers.

The response rates in the pilot survey were approximately 80 percent among establishments, and 55 percent among workers. The relatively low worker response rate was due to the process used to contact the workers (through the establishments), rather than the content of the survey itself. Steps are being taken to significantly improve this contact process, and thereby the response rates, in the production survey.

⁴ Establishments were sampled instead of companies because: (1) The workplace events in which we are interested, such as adoption of technology and human resource practices, can vary from establishment to establishment within a multi-establishment company. Events are better defined within a narrow rather than broad workplace. (2) If the company were the sampled unit, establishing an association between workplace events and worker outcomes would be very difficult, since in a multi-establishment company the sampled workers might work in some establishment other than that where the practices or events of interest were located. (3) The goal is to make the survey longitudinal in the workplace. Establishments can be tracked longitudinally more easily than companies. The latter may be involved in mergers or sell-offs, which make defining the longitudinal unit very difficult.

⁵ Krebs, Howard, Zdenek Patak, and Ted Wannell (1997), "The Workplace and Employee Survey: Methodological Challenges and Pilot Results," Paper presented at Symposium 97, Statistics Canada, Ottawa, Autumn 1997.

⁶ Contact the WES project manager at (613) 951-4063.



Table 1.1: Industry/Province Combinations — Sample Sizes and Estimated Populations

Industry/Province	Establishments		Employment	
	Sample size	Estimated population	Sample size	Estimated population
Logging, forestry, mining, quarries, and oil wells — Quebec, British Columbia	58	3,430	152	68,092
Manufacturing: science-based — Canada	78	4,709	243	219,135
Scale-based manufacturing — Ontario	73	4,586	115	349,477
Transportation/storage/wholesale — Manitoba, Saskatchewan, Alberta	71	14,352	241	241,646
Retail trade and commercial services — Manitoba, Saskatchewan	46	11,897	130	235,200
Finance and insurance — Quebec	39	3,316	149	118,465
Real estate operations and insurance agents — Ontario	66	12,699	162	103,375
Business services — Alberta	42	3,251	139	72,563
Construction — all regions except Manitoba, Saskatchewan, Alberta	48	34,915	36	150,594
Communications and other utilities — Canada	47	503	158	361,557
Education and health services — Atlantic provinces, Quebec	38	100	125	229,410
Manufacturing: product-differentiated — Canada	75	1,735	148	162,939
Other	67	19,447	162	307,519
Total	748	114,940	1,960	2,619,972

Summary of Findings

As can be seen from Chart 1, the WES contains a broad range of content. Not all can be included in this overview. The focus here is on the establishment survey results, since least is known in this area. Some data from both surveys are presented here, but the detailed analysis of linked results is left to forthcoming research papers. This overview presents basic findings in the following four areas:

1. business strategies;
2. technology adoption and organizational change;
3. training, establishment practices, and new technology; and
4. hiring, job vacancies, and worker separations in establishments.

Business Strategies

Business strategies are a topic of substantial interest in the 1990s. Increased globalization is seen to be driving the use of cost-reduction strategies, as companies try to alter their modes of production in order to improve competitiveness. Human resource management strategies are becoming increasingly important in a world of rapid technological change, as human resource development is seen as being complementary to the successful introduction of technologies. Product development strategies have a more restricted application, as not all companies attempt to use R&D and other approaches to altering products. For many companies, however, product and process innovation is seen as crucial to growth.

The survey focused on four types of business strategies: (1) cost-reduction strategies; (2) human resource management strategies; (3) product development strategies; and (4) product/service quality-related strategies. In the current rapidly changing economic environment, just how important are such strategies to Canadian firms? What types of firms tend to adopt different types of strategies? And how is the use of these strategies associated with other characteristics of firms and workers?

Cost-reduction strategies are very important to a substantial number of establishments, but certainly not all. About one-quarter of establishments indicated that reducing labour costs was very important or crucial for their firm. Cost-reduction strategies were used particularly by large establishments and those in construction, communications, education, and the financial sector (among those sectors surveyed in this pilot). Since the use of downsizing (as reported in the chapter on organizational change) was highly correlated with the reported importance of cost-reduction strategies, downsizing would seem to be an important component of cost-reduction.

One strategy often thought to be employed by firms in order to reduce labour costs did not come out as dominant in this survey: the use of part-time, temporary, or contract workers. Only 6 percent of establishments (representing 13 percent of workers) listed this as a very important or crucial strategy, well below other reported cost-reduction strategies. This fits with the “organizational change” results reported elsewhere in the survey. Only 12 percent of establishments (representing 30 percent of employment) indicated that they had increased their reliance on part-time or temporary workers over the past three years. Only 2 percent said it was the most important form of organizational change during that period. This was one of the least-often reported forms of organizational change. These data suggest that most establishments do not see radically altering the manner in which they engage labour as one of the most important strategies to deal with changing economic circumstances. There have of course been such changes, but they are apparently not at the top of the companies’ lists of approaches to cost-reduction, at least as reported by the companies.

Human resource management strategies are also of intense interest. It is generally accepted that in order to maximize the benefits of new technologies, especially information technologies, their implementation must go hand-in-hand with human resource development. In a labour market which increasingly discounts the contributions

of lower-skilled workers, human resource development is seen as crucial by many policy analysts and commentators. What do the establishments in this survey believe?

About 20 percent of establishments indicated that human resource strategies in general (including increasing employee skills, increasing employee involvement, enhancing labour/management relations, etc.) were very important or crucial to the establishment's business. Thirteen percent indicated that they were not at all important. Human resource strategies were important in the higher technology sections, including the financial sector, communications, and education. They were not particularly important in the lower-wage/skilled sectors such as the retail sector, real estate, transportation, some goods-producing sectors such as logging and mining, and construction. Not surprisingly, larger establishments tended to place more importance on such strategies than smaller ones did. Establishments that valued human resource strategies tended to use other related approaches, such as adopting alternative work arrangements and employing more progressive work organizational practices. This was confirmed by the workers' responses, as those who worked in these establishments reported a much higher level of training, more flexible work hours, and participation in progressive organizational practices. Thus, the workers confirmed the existence of the practices that operationalize the business strategies reported by the establishments.

Although human resource strategies are very important to some establishments, there are many that do not rate them as essential. There is no reason to believe that it is profitable for all establishments to adopt such strategies. The frequency of their use would depend on the payback they provide. In high-technology, higher-skilled sectors, the payback may be much greater than among lower-skilled sectors. It has been observed that the more highly educated or skilled train at higher levels than the less skilled. Future work could focus on the worker and establishment outcomes of firms that adopt different approaches to human resource strategies.

Product development constitutes another area of interest, as product and process innovation is seen as a very important determinant of growth. Patterns of product development strategies, such as undertaking R&D, developing new products/services, and developing new production techniques were reported. Such strategies are restricted to a small set of establishments; about 12 percent indicated that they were very important or crucial, while nearly 40 percent said they held no importance whatsoever to their establishment. Establishments adopting such strategies tended to be in manufacturing and business services (among the industries surveyed). Such strategies were notably absent in the retail sector, real estate, and construction, and among very small establishments. It is likely that many small establishments would not have the resources to adopt such strategies.

Establishments that adopted product development strategies tended to charge higher than average prices, have a broad market base, be engaged in active recruitment, and have unfilled vacancies in spite of such efforts. The linked nature of the WES also allows a glimpse of the worker characteristics in these establishments. Workers in establishments stressing product development tended to be educated to a higher level, receive more training, have longer job tenure, and earn higher wages (after controlling

for human capital characteristics) than workers in establishments that do not focus on such strategies. For establishments, an emphasis on product and process development strategies seemed to be associated with higher prices and wages, higher levels of training and human capital, and more difficulty in locating the necessary types of workers in the labour market.

Overall, the data in this pilot survey indicate that establishments select many different roads to what they hope is success. There is considerable variation among establishments in the reported use of various strategies. Even in the case of cost-reduction strategies, where one might expect to see more consistency among establishments, some establishments reported them as being very important, while others indicated that they are not one of the principal means of achieving their business goals.

Systematic variation in the use of various strategies was observed across industries and establishments of different sizes. It is likely that there is also substantial variation among establishments within industry/size categories as well, although this has not yet been explored. Such variance holds out the hope that the reported business strategies might be useful discriminating variables when trying to understand worker or establishment outcomes. Are the strategies that an establishment follows associated with wage levels, training patterns, and technology use among workers? Are they associated with revenues and market share among establishments? It is hoped that such questions will form the substance of future research.

Technology Adoption and Organizational Change

Technology adoption is seen to be associated with many changes in the labour market, including a declining relative demand for lower-skilled workers and an increasing demand for the highly skilled — a shift that results in higher relative wages for the more highly skilled, and therefore rising earnings inequality. There is also some debate over the employment creation effects of the new technologies. Most economists believe that, as in the past, such technological change will lead to greater employment and wealth. Others are not so sure, noting the worker displacement effects of the information technologies. The association between the introduction of technologies and productivity growth is also in dispute. The “productivity paradox” (the lack of substantial measured labour productivity gains in an era of considerable investment in information technologies) is not well understood, and is a subject of great debate. There are numerous other issues involving technological change, but it is a concept that is very difficult to measure. How many Canadian establishments are in fact heavily involved in the adoption of these technologies, and where are they concentrated?

This survey used a number of straightforward questions on the implementation of technology to provide basic facts, and to associate this technology adoption with other worker and establishment outcomes. Establishments were asked whether they had implemented a major hardware/software installation during the past three years, whether they had adopted some other computer-assisted technology and, finally, whether they had implemented other types of technologies. The emphasis was on the

first two information technology-related questions. Additional information was gathered on the cost of this investment, the training associated with it, the number of workers affected, and who tends to use the technology. These were clearly experimental questions, as obtaining economy-wide information on technology adoption is difficult.

Organizational change is another concept, not well defined, about which one hears a great deal. Establishments are believed to undergo substantial organizational change in response to more macro-level developments such as increased competition, technological change, and changes in international trade and foreign direct investment. It is often stated that organizational and technological change are necessarily complementary if establishments want to benefit from technological change. In this survey, organizational change includes practices such as downsizing, re-engineering of business processes, centralization or decentralization of services, changes in the ways establishments engage labour (e.g., contracting out, use of temporary/part-time workers), and reduction in the number of managerial levels.

The results suggest that downsizing and re-engineering were the predominant forms of organizational change during the three years prior to the survey. Downsizing⁷ was reported in one-quarter of establishments, representing over one-half of all workers in the sample. Re-engineering was reported in almost one-third of establishments, accounting for two-thirds of workers. When establishments were asked to name their most important organizational change, these two were the only ones to receive any substantial response. As noted earlier, “numerical flexibility”, as reflected by the increased use of part-time, contract, or temporary workers, was not reported by many firms as a significant organizational change.

The implementation of information technologies during the three years prior to the survey was reported by a little over one-third of all establishments, accounting for 55 percent of employment. Thirteen percent of establishments reported implementing some other form of technology. In addition, 23 percent of establishments (representing 46 percent of workers) reported a product/service or process innovation over the same period. About half of all establishments (representing 29 percent of employment) did not report either the implementation of a new technology or an innovation. Not all firms are turning to the implementation of technology and innovation as a means of achieving growth. However, almost two-thirds of workers in this sample reported using a computer. The use of information technologies by workers is widespread, and more will be said of the intensity of use in other research now underway.

What of the association between technological and organizational change? As noted, one of the most important organizational changes was downsizing. Significantly, however, preliminary analysis of these data shows little association between downsizing and the adoption of computer-based technologies. Of the

⁷ It is not clear exactly how establishments interpreted this term. It is usually meant to suggest a decrease in employment for some reason other than a routine (e.g., seasonal or cyclical) and temporary reduction in product demand. It is normally associated with a permanent decrease in employment levels and a restructuring of work and jobs in order to increase competitiveness and profits. It is not clear whether establishments interpreted the question in this manner. The production survey version has been altered to address this concern.

establishments that downsized, 68 percent did not adopt a computer-based technology, while 32 percent did. And of those establishments that adopted this technology, 14 percent reported downsizing, as compared to 16 percent of establishments that did not adopt a computer-based technology. This suggests most downsizing was not in response to the implementation of technology, nor was it directly associated with it. These are preliminary results, however, as the manner in which respondents interpreted the downsizing question is not clear (see footnote 7). Furthermore, there are no controls for establishment size or other characteristics in this analysis. Re-engineering of the business process was strongly associated with the adoption of technologies, however, as one might expect. In general, establishments that adopted a computer-based technology were more likely to have made an organizational change (with the exception of downsizing) than those that did not. However, since there are few controls in this analysis, a more definitive answer to this issue awaits further work.

Training, Establishment Practices, and New Technology

There is no shortage of surveys on training. Both establishment and household surveys have been quite numerous in Canada. None, however, has the ability of the WES to link training to so many other variables. The objective of this survey is not to produce yet another estimate of the number of firms that train, but rather to allow training to be related to other outcomes, such as the introduction of technology and the wage rates of workers. Furthermore, the WES has three distinct sections on training: that offered by establishments as reported by the establishments, that taken by the workers as reported by the workers, and the training associated with the introduction of technologies. This allows a much deeper analysis of training. One can obtain information not only on the incidence of training among establishments, but measures of intensity as well, which would include the proportion of workers training within various kinds of establishments and the duration of training. Establishment surveys alone cannot do this and, as we will see, this can lead to potentially misleading results.

The overview presented here does not delve into all of these dimensions; it is simply beyond the scope of this work. Forthcoming research projects will cover more ground. The results here indicate that while 38 percent of establishments train, numeracy and literacy training are notably absent. It is suggested that, because such general training is not industry- or establishment-specific, there is reluctance on the part of establishments to offer it. It may also be that most establishments simply do not see the importance of such training, and instead tend to focus more on task-specific training, such as computer training.

Patterns of training by sector found by the WES confirm the differences that are observed when using other measures. For example, the proportion of establishments that train, a commonly-used measure in establishment surveys, suggests that training is particularly high in the financial, communications, and education sectors, where about 90 percent or more of establishments offer training compared to 38 percent overall. However, the WES also found that, when workers in these same establishments

are asked who receives training, there is much less variation among industries. Overall, 41 percent of workers receive training, and in the high-intensity industries just mentioned, from 52 percent to 63 percent of workers trained. In some industries, such as product-differentiated manufacturing, an above-average proportion of establishments train (71 percent) but a below-average share of the workers receive training (29 percent). The incidence of training reported by workers seems to be a much better reflection of the training activity than the incidence of training reported by establishments.

Recently researchers have been focusing on training as one of a “bundle” of activities that some firms undertake in order to increase productivity. These data provide some support for the notion that firms that undertake training do not do so in isolation from other activities, but rather as an integral part of a larger endeavour. One might expect firms that are re-engineering their business practices to offer increased levels of training as support. The WES showed that establishments undergoing such re-engineering were indeed much more likely to offer training than those that did not; however, the share of workers taking training in the firms re-engineering their work processes was no higher than among all firms. Hence, there is mixed evidence about the association between re-engineering and training levels. To adequately address these issues, one should at least determine if there is a higher than average training rate associated with re-engineering after having controlled for other characteristics that will affect it, such as establishment and worker characteristics. Future work is required to address this concern.

Another change related to training is work organization. Almost all establishments that altered work organization through such means as quality circles or flexible job design also offered training. Regarding the association with business strategies, not surprisingly, establishments that highlighted the importance of human resource management strategies had very high training rates, while those that stressed cost-reduction strategies tended to train less than average. In general, this preliminary data analysis finds that firms that attempt to alter their job design also invoke higher than average levels of training, no doubt to support the same goals of increased productivity.

Finally, the WES addressed the role of formal training in technology use and adoption. One would expect training to play a very large role as firms try to maximize the effectiveness of the technologies. Perhaps the most striking finding is that, while this and other studies find enhanced levels of formal training among workers using computers, such training apparently plays a relatively small role in the acquisition of skills. Casual observation would suggest that much of the skill acquisition is through informal training and self-learning. This is strongly supported by the employee responses to questions about how computer skills are acquired. It is unknown whether informal training and self-learning predominate because formal training is unavailable, or because they offer a more efficient manner of acquiring the skills.

Hiring, Job Vacancies, and Worker Separations

Labour market turnover and job vacancies, and their association with activities such as training, technological adoption, and organizational change, raise important research questions for many policy analysts. In the establishment survey, the WES asked firms to indicate their experiences over the previous year regarding labour turnover and job vacancies. The reader is cautioned that hirings and separations cannot be equated with job creation. Hiring can be due to replacement demand (created by workers leaving) or expansion demand (created by net new job creation). Job vacancies can give a sense of unfilled demand, however, and this is an important measure. Moreover, the data do provide a picture of employment dynamics at the establishment level, and the large number of variables in the WES offers the opportunity to relate these dynamics and turnover patterns to other establishment and worker activities.

The WES shows that more than one-half of all firms engaged in some hiring in 1995. Small firms were the most likely to hire, probably because they have the highest separation rates. Firms in both the goods and the service sectors engaged in hiring, although relatively few workers were hired by large goods sector companies (only about 4.6 percent of workers in such establishments were hired that year, compared to 17.5 percent among establishments in general). Of all the workers hired in 1995, large goods sector firms accounted for only 5 percent.

Hiring was disproportionately concentrated among lower-skilled workers. This was likely not because of high demand for these workers, but because of high worker turnover in these kinds of jobs. Hiring of lower-skilled workers was particularly predominant in the goods sector. Service sector establishments in the sample hired relatively few lower-skilled workers.

In this sample, the number of reported job vacancies in 1995 was quite small, representing only one percent of employment. The vacancies that did exist were distributed among professional, sales, technical, and unskilled jobs, although they were more prevalent among professional jobs. While representing only 10 percent of employees, the professional categories accounted for 28 percent of job vacancies in the sample. Some of these jobs had been vacant for some time; 30 percent of them had been unfilled for four months or more. While there are pockets of job vacancies that are difficult to fill, this evidence does not suggest a large number of unfilled jobs due to "structural" causes.

Worker separations were due to both employer-initiated layoffs and employee-initiated quits. The former were somewhat greater than the latter in 1995, a year of not particularly strong economic growth or job openings. Labour turnover in general was seen to be lower among establishments that adopted new technologies, but this is without controlling for other characteristics such as size and industry. It was also lower among professional and technical workers and larger establishments. This may explain part or all of the turnover discrepancy between firms that adopted technologies and those that did not.

Concluding Statement

The findings in this report from the pilot survey provide a first glimpse of the information that can be generated from the Workplace and Employee Survey. Research projects to further exploit these data are continuing. With the full-scale production survey, problems regarding the representative nature of the results will be overcome. The intention is to make the survey longitudinal. The establishments would be tracked for a number of years, the workers for two years. This will open an entirely new area of research, since analysts will no longer have to depend only on cross-sectional data to produce associations between variables. Longitudinal data will allow changes in variables of interest (dependent variables) to be associated with changes in potentially explanatory variables; this is a superior way of addressing many issues.

Chapter 2 — Restructuring in the Nineties: Organizational Change, Technology Adoption, Innovation, and Computer Use

Darren Lauzon

This chapter addresses three major components of structural change surveyed in the “Workplace and Employee Survey” (WES): adoption of new technology; innovation in products and services and the way they are produced; and new ways of organizing work and business. All are part of what many commentators loosely call “structural change.” The WES enables analysts to examine these components of change both individually and in concert, and thereby to determine what aspects of new technology, new goods and services, and new ways of working and doing business are involved in economy-wide “restructuring.” We will therefore examine the incidence and scope of organizational change, new work organization, technology adoption, computer use, and innovation. We will briefly explore the incidence of “non-standard” employment as it relates to computer-based technology adoption and computer use. Finally, we will close by examining the degree of association between computer-based technology adoption and organizational change.

Changes in How Business and Work are Organized

In the WES we asked employers whether they had undertaken any of the following in the three years prior to the survey:

- Downsizing (reducing the number of employees on payroll to reduce expenses)
- Re-engineering (focusing on the redesign of business processes to improve performance and cost)
- Increased integration among different functional areas
- Increase in the degree of centralization with elimination of decentralized sub-offices
- Decrease in the degree of centralization
- Greater reliance on temporary workers
- Greater reliance on part-time workers
- Increase in overtime hours

While one-quarter of establishments reported that they had downsized in the previous three years, downsizing is not the complete picture. About one-quarter of establishments also re-engineered their business processes or relied more on functional flexibility.
Establishments re-engineering in the three years prior to the survey accounted for 66 percent of employment at the time of the survey.

- Adoption of flexible working hours
- Delayering (reducing the number of managerial levels)
- Greater reliance on functional flexibility (through job rotation, multi-skilling, total quality management)
- Increased reliance on external suppliers of products or services
- Increased inter-firm collaboration in R&D, production, or marketing.

Table 2.1 shows both the proportion of establishments that indicated they had undertaken any of these 13 changes and their share of employment. Almost half of WES establishments made no organizational change at all. These were mostly smaller establishments, as their share of employment reflects. As one might expect, given the time period covered, downsizing was a significant event, both in the proportion of establishments (just over one-quarter had downsized) and also in the proportion of workers currently working for establishments that had downsized in the last three years (over half of total employment).

Table 2.1: Incidence of Organizational Change

	Percent of establishments	Percent of employment
No change	43.7	13.1
Downsizing	25.1	54.1
Re-engineering	31.1	66.6
Increased integration	24.7	56.6
Increased centralization	4.6	26.2
Decreased centralization	5.6	26.9
Greater reliance on temporary workers	12.9	26.8
Greater reliance on part-time workers	12.7	30.0
Increase in overtime hours	12.1	34.8
Adoption of flexible working hours	21.7	29.5
Delayering	7.6	43.6
Greater reliance on functional flexibility	26.5	57.4
Increased reliance on external suppliers	17.4	42.6
Increased inter-firm collaboration in R&D	13.2	37.2

But downsizing is not the complete picture. About one-quarter of establishments also re-engineered their business processes or relied more on functional flexibility. Establishments re-engineering in the last three years accounted for 66 percent of employment at the time of the survey. Changes in the nature of work were also evident. More than one in five employers adopted flexible working hours and about 12 percent of employers relied more on temporary or part-time workers and/or increased their use of overtime.

Table 2.2 shows which changes, of all those examined in the WES, establishments considered to be their most significant in terms of the number of employees affected.¹ Table 2.3 shows that these results are consistent across size groups; i.e., for organizations of all sizes, both downsizing and re-engineering carry the day.

Table 2.2: Incidence of Most Significant Organizational Change

	Percent of establishments	Percent of employment
Downsizing	15.7	32.6
Re-engineering	18.2	24.9
Increased integration	2.3	5.0
Increased centralization	0.6	1.3
Decreased centralization	0.5	1.6
Greater reliance on temporary workers	1.6	1.0
Greater reliance on part-time workers	2.8	6.6
Increase in overtime hours	3.4	4.0
Adoption of flexible working hours	3.4	0.7
Delayering	0.1	0.2
Greater reliance on functional flexibility	4.2	5.2
Increased reliance on external suppliers	2.8	2.2
Increased inter-firm collaboration in R&D	0.7	1.5

¹ The survey question defined “significant” as the change affecting the most employees.

Table 2.3: Most Significant Organizational Change by Establishment Size

	Percent of establishments				Percent of employment			
	0-19 employees	20-99 employees	100-499 employees	500+ employees	0-19 employees	20-99 employees	100-499 employees	500+ employees
Downsizing	15.0	17.9	24.8	30.4	10.3	21.4	22.5	49.9
Re-engineering	16.8	25.6	31.5	25.7	22.1	27.7	35.0	20.5
Increased integration	2.2	3.2	3.5	5.8	4.4	2.5	4.2	6.6
Increased centralization	0.2	2.7	3.6	0.6	0.5	1.9	3.8	0.3
Decreased centralization	0.2	2.4	0.0	2.2	0.6	1.9	0.0	2.5
Greater reliance on temporary workers	1.6	1.9	0.9	0.5	1.3	1.2	1.1	0.8
Greater reliance on part-time workers	2.2	5.5	6.0	N.A. ²	3.3	2.9	8.1	N.A. ²
Increase in overtime hours	2.9	7.1	6.6	0.3	8.2	7.3	6.0	0.1
Adoption of flexible working hours	3.9	0.3	1.1	0.0	2.8	0.3	0.9	0.0
Delayering	0.0	0.5	0.2	0.0	0.0	0.8	0.3	0.0
Greater reliance on functional flexibility	3.4	10.0	6.4	5.3	5.5	9.3	5.2	3.3
Increased reliance on external suppliers	2.9	2.3	3.3	1.2	2.7	2.9	3.1	1.5
Increased inter-firm collaboration in R&D	0.6	1.3	1.8	0.6	1.2	1.7	1.4	1.7

In addition to organizational changes, we asked establishments in the WES whether they had implemented any of the following kinds of work organization:

- An employee suggestion program
- Flexible job design
- Information sharing with employees
- Quality circles, problem-solving teams
- Joint labour-management committees
- Self-directed work groups.

In light of the incidence of greater reliance on functional flexibility, discussed above, it is somewhat surprising that the incidence of all these newer ways of organizing work was low (Table 2.4). This, however, appears to be an artifact of establishment size, as Table 2.5 shows. While overall incidence of implementation was no higher than roughly 7 percent (for employee suggestion programs), quality circles were particularly popular among mid-sized establishments. Nearly one in five establishments with between 100 and 499 employees implemented quality circles. This explains why, although only 4 percent of establishments introduced quality circles, these establishments accounted for 11.6 percent of employment.

² Data not available.

Table 2.4: Incidence of New Work Practices

	Percent of establishments	Percent of employment
Employee suggestion programs	7.2	8.3
Flexible job design	3.2	6.0
Information sharing with employees	5.9	7.0
Quality circles, problem solving teams	4.0	11.6
Joint labour-management committees	1.1	6.0
Self-directed work groups	3.1	5.2

Table 2.5: New Work Practices by Establishment Size

	Percent of establishments				Percent of employment			
	0-19 employees	20-99 employees	100-499 employees	500+ employees	0-19 employees	20-99 employees	100-499 employees	500+ employees
Employee suggestion programs	7.0	7.8	10.9	7.7	9.9	20.0	10.8	6.0
Flexible job design	3.2	1.9	2.9	4.8	7.4	2.3	3.4	8.0
Information sharing with employees	6.0	4.2	7.2	5.6	10.0	5.2	7.1	6.6
Quality circles, problem solving teams	2.3	1.5	18.2	8.2	7.6	13.7	18.6	9.3
Joint labour-management committees	0.2	6.3	6.8	6.1	0.9	4.7	7.1	8.1
Self-directed work groups	3.3	1.2	2.6	4.7	7.0	0.5	4.8	6.4

New Technology, Goods, and Services

Another significant part of what people consider to be “restructuring” is the adoption of new technologies and innovation in goods and services and how they are produced. What’s more, some commentators see “rapid technological change” as the widespread diffusion of new (predominantly computer-based) technologies, while others refer primarily to innovation. The WES distinguishes between technology adoption and innovation; between significantly new computer software and hardware adoption, computer-assisted technologies like retail scanners and manufacturing robots, and other technologies (optical, laser, biotechnology, etc.); and between product and process innovation.³ What is worth noting first is that *half* of establishments, representing 29 percent of employment, neither adopted technology nor introduced any innovation in the three years preceding the survey. It is certainly possible that some of these establishments might have been actively introducing new technology, processes, or products before 1992, or that they established themselves after 1992. We focus first on the patterns of technology adoption the WES revealed. For this section, we consider significantly new hardware and software as well as computer-assisted technologies to be “computer-based technologies” (CBT).

The advantage of surveying both innovation and technology adoption lies in comparing their complementarity. Fifteen percent of establishments, accounting for over one-third of employment, both adopted new technology and introduced a new product or process innovation.

³ For service producers, “product innovation” means “new service” and “process innovation” means “change in existing services.”

Among the remaining half of establishments that did innovate or acquire some new technology in the preceding three years, technology adoption predominated. The 42 percent of establishments adopting new technology accounted for 60 percent of employment, and it is clear from Table 2.6 that the majority of these establishments adopted computer-based technologies. But computer technologies were not the complete picture. Other non-computer-based technologies were also acquired by some 13 percent of establishments accounting for 16 percent of employment. About half of these (about 7 percent of establishments) adopted these other technologies exclusively (i.e., not in combination with a computer-based technology).

We were not surprised to find technology adoption more prevalent than innovation. The WES shows the degree to which this is the case. Compared with the 42 percent of establishments that adopted technology, 23 percent undertook an innovation. Product innovation prevailed over process innovation, being introduced by 17 percent of establishments. A small proportion of establishments introduced both a product and a process innovation. Overall, innovators accounted for 46 percent of employment.

The advantage of surveying both innovation and technology adoption lies in comparing their complementarity. As noted above, technology adoption was more common. Moreover, 27 percent of establishments adopted technology but did not report introducing a product or process innovation. About 9 percent reported introducing an innovation but not adopting any new technology. The WES results suggest, then, that these two aspects of technological change are not entirely interchangeable. The full-scale longitudinal WES will allow analysts to better understand the distinction between technology adopters and product or process innovators. That said, nearly 15 percent of establishments did both, and these accounted for over one-third of employment.

Table 2.6: Technology and Innovation

	Percent of establishments	Percent of employment
No technology adoption or innovation	49.5	29.2
Technology adoption or innovation	50.5	70.8
Technology:	41.9	59.9
Computer-based	35.2	55.8
Other	12.8	16.0
Both	6.1	11.9
Innovation:	23.3	46.0
Product	16.7	34.3
Process	10.9	29.8
Both	4.3	18.1
Both technology and innovation	14.8	35.0
Technology but not innovation	27.2	24.8
Innovation but not technology	8.5	11.0

Computer-Based Technology Adoption: The Employee's Perspective

Employees surveyed in the WES pilot were also asked questions concerning computer use and whether the technological complexity of their jobs had increased, decreased, or stayed the same since they were hired. Responses to these questions also provide a picture of technology in the economy of the early 1990s.

About 64 percent of employees reported working with computers. A majority of respondents (nearly 60 percent) reported that the technological complexity of their jobs had increased over the 12 months preceding the survey date. The rest reported little or no change.

About 64 percent of employees reported working with computers. A majority of respondents (nearly 60 percent) reported that the technological complexity of their jobs had increased over the 12 months preceding the survey date.

Table 2.7: Computer Use and Technological Complexity

	Percent of employees saying "yes"
All employees	
• Use of a computer	64.4
• Increase in technological complexity "since hired"	58.8
Employees in establishments reporting technological change and not innovation	
• Use of a computer	58.5
• Increase in technological complexity "since hired"	56.7
Employees in establishments reporting innovation and not technology adoption	
• Use of a computer	74.5
• Increase in technological complexity "since hired"	64.3
Employees in establishments reporting both innovation and technology adoption	
• Use of a computer	66.5
• Increase in technological complexity "since hired"	62.1

In establishments that reported only technology adoption during the three years preceding the survey date (i.e., those that did not also report developing an innovation), about 59 percent of employees reported using a computer, and a slightly smaller proportion reported that the technological complexity of their jobs had increased since they were hired. In establishments that reported innovation and *no* technology adoption, we see that three-quarters of employees use a computer and 64 percent reported increased technological complexity. About two-thirds of workers in establishments that both innovated *and* introduced a new technology reported using a computer, and about 62 percent reported an increase in technological complexity.

Table 2.7 shows what might be a perplexing result: it appears that computer users are slightly over-represented in establishments that do not adopt technology exclusively (that is, they tend to be in establishments that innovate or both innovate *and* adopt technology). But note that this table does not control for sector or occupation. It is quite possible that many of these users worked either in service sector jobs or in occupations in which computer use is heavily concentrated. To be more conclusive, a multivariate analysis controlling for sector and occupation is needed.

Work Arrangements, Technology, and Innovation

WES data show that much fewer computer users than computer non-users work outside of the standard Monday to Friday, 6 a.m. to 6 p.m. work week; however, they are more likely to work at home as part of their job.

It is worth digressing for a moment on the nature of work done by those affected by technology. Many argue that the flexibility associated with new, predominantly computer-based technologies drives the observed increases in non-standard work.⁴ Table 2.8 shows that while 24 percent of all workers do not work the standard Monday to Friday, 6 a.m. to 6 p.m. work week, only 13 percent of computer users, compared to 45 percent of computer non-users, work outside these days and hours. Thirty-eight percent of workers who use computers reported flexible hours, not much higher than the 29.2 percent of workers who don't use a computer. Where computer use really matters is in the likelihood of working at home. Forty-four percent of computer users reported working at home, compared to 18 percent of those who do not use a computer.

The story is somewhat different for workers in establishments that adopted computer-based technology in the three years preceding the survey date. Compared with computer users, a higher proportion of workers in these establishments work outside the standard Monday to Friday, 6 a.m. to 6 p.m. window, but this is lower than the proportion that work for CBT non-adopters and work outside these hours. There seems to be little correlation between working in an establishment that recently adopted CBT and working flexible hours, although workers who did not work for a CBT adopter were slightly more likely to work flexible hours. There is even less evidence that working for CBT adopters is associated with work at home. This suggests that if one wants to make claims about the impact of technology on alternative work arrangements or so-called "non-standard" work, it is essential to look directly at the employees using the technologies rather than the places in which they work.

⁴ In this chapter, by "non-standard work" we mean work done predominantly outside the standard Monday to Friday, 6 a.m. to 6 p.m. day, flexible hours arrangements, and work at home.

Table 2.8: Computer Use, Computer-Based Technology Adoption, and Work Arrangements



	Work each day from Monday to Friday for at least six hours per day between the hours of 6 a.m. and 6 p.m. (% no)	Work flexible hours (% yes)	Work at home (% yes)
All workers	24.2	34.9	34.6
Workers who use computers	12.7	38.1	43.8
Workers who do not use computers	45.0	29.2	17.9
Workers in establishments adopting CBT	19.3	33.8	36.4
Workers in establishments not adopting CBT	33.2	37.0	31.2

Bringing It All Together: The Complementarity of Technological and Organizational Change

Of all WES establishments, 26 percent, accounting for just 5 percent of employment, neither adopted technology, reported an innovation, nor undertook an organizational change. Stated another way, nearly 74 percent of establishments did at least one of these things, and, more importantly, they accounted for nearly 95 percent of employment.

Looking more closely at the combinations of activity, 17.4 percent of establishments, accounting for 7.8 percent of employment, either adopted technology or innovated without a concomitant organizational change, and 23 percent of establishments, accounting for 24 percent of employment, reported some organizational change but no technology adoption or innovation. This leaves one-third of establishments, accounting for 63 percent of employment, that combined technology adoption, innovation, and a significant organizational change in the three years prior to the survey.

Adoption of computer-based technology and downsizing were virtually uncorrelated. However, at the time of the survey, computer users were much more likely to be working in an establishment that had recently downsized.



Table 2.9: Technology Adoption, Innovation and Organizational Change

	Percent of establishments	Percent of employment
No organizational change, no adoption of new technology, no innovation	26.3	5.4
Adopted technology or innovated but reported no organizational change	17.4	7.8
Adopted no technology and did not innovate but reported organizational change	23.3	23.8
Adopted technology change or innovated and reported organizational change	33.1	63.1



Table 2.10 focuses on computer-based technological change and innovation, and shows the proportions of establishments reporting one of these *and* citing one of the 13 organizational changes as most significant.

Table 2.10: Most Significant Organizational Change by CBT Adoption and Innovation[†]

	Percent of establishments that implemented:			
	Computer-based technology		Product or process innovation	
	No	Yes	No	Yes
No change	51.9	28.6	47.1	34.0
Downsizing	16.5	14.4	18.0	7.9
Re-engineering	14.0	25.8	16.1	24.9
Increased integration	1.8	3.4	1.1	6.3
Increased centralization	0.4	1.0	0.6	0.5
Decreased centralization	0.3	0.7	0.2	1.1
Greater reliance on temporary workers	1.8	1.4	1.4	2.1
Greater reliance on part-time workers	1.5	5.3	2.9	2.6
Increase in overtime hours	1.8	6.4	3.0	4.8
Adoption of flexible working hours	5.0	0.6	3.2	4.2
Delayering	0.0	0.1	0.1	0.0
Greater reliance on functional flexibility	3.4	5.9	3.4	6.9
Increased reliance on external suppliers	1.4	5.4	2.5	3.8
Increased inter-firm collaboration in R&D	0.4	1.2	0.6	1.0

[†] Columns add to 100.

Consistent with the results for all establishments, downsizing and re-engineering were the dominant activities of CBT adopters and innovators. Some differences between CBT adopters and innovators stand out. First, establishments adopting CBT were much more likely to have made an organizational change than establishments that did not. The correlation between making an organizational change and innovating seems weaker. Second, CBT and downsizing are virtually uncorrelated — only a slightly higher proportion of non-adopters than adopters downsized — but CBT adopters seem more likely to report re-engineering than non-adopters. On the other hand, innovating seems to be associated with *not* downsizing as well as with re-engineering.

Table 2.11 shows the percentage of employment represented by establishments adopting CBT or innovating and reporting a significant organizational change. The story changes a little. First, there is much less correlation between adopting CBT and undertaking an organizational change; that is, the share of employment accounted for

by CBT adopters that report no organizational change is quite close to that of CBT non-adopters. Behind this is the fact that establishments not making organizational changes tend to be small. Second, the employment-weighted incidence confirms that CBT adoption and downsizing are uncorrelated, since almost equal shares of employment are accounted for by CBT adopters that downsize and non-adopters that downsize. Third, the correlation between re-engineering and CBT adoption is much smaller than when we considered the proportion of establishments. A difference for innovators is worth noting. Considering the share of employment in establishments that innovate and downsize, we see that the 7.9 percent of establishments that both innovate and downsize account for 37 percent of employment in innovating establishments. These establishments are likely the larger ones, and thus controlling for size would certainly reduce, and possibly eliminate, this relationship across all establishments.

Table 2.11: Most Significant Organizational Change by CBT Adoption and Innovation[†]



	Percent of employment represented by establishments that implemented:			
	Computer-based technology		Product or process innovation	
	No	Yes	No	Yes
No change	16.2	10.7	17.5	8.0
Downsizing	32.6	32.5	28.8	37.0
Re-engineering	21.9	27.3	23.0	27.2
Increased integration	6.4	3.9	4.9	5.0
Increased centralization	1.9	0.8	1.8	0.6
Decreased centralization	1.4	1.8	1.4	1.8
Greater reliance on temporary workers	0.3	1.6	0.3	1.9
Greater reliance on part-time workers	10.5	3.6	11.8	0.6
Increase in overtime hours	1.9	5.6	4.1	3.9
Adoption of flexible working hours	1.0	0.5	0.5	0.8
Delayering	0.1	0.3	0.2	0.2
Greater reliance on functional flexibility	4.0	6.1	3.5	7.2
Increased reliance on external suppliers	1.6	2.8	1.7	2.9
Increased inter-firm collaboration in R&D	0.3	2.5	0.4	2.9

[†] Columns add to 100.

This “employment” perspective is still largely establishment-based, and largely driven by the distribution of establishment size. The employee side of the WES, however, provides some direct worker evidence of the relationship between technology and organizational change. Table 2.12 focuses on computer use.



Table 2.12: Most Significant Organizational Change and Computer Use[†]

	Percent of workers who:	
	Do not use a computer	Use a computer
No change	15.7	6.8
Downsizing	17.6	41.9
Re-engineering	22.2	25.0
Increased integration	3.5	5.1
Increased centralization	1.5	1.5
Decreased centralization	1.2	1.2
Greater reliance on temporary workers	1.5	0.3
Greater reliance on part-time workers	21.2	0.8
Increase in overtime hours	4.7	6.7
Adoption of flexible working hours	0.3	0.3
Delayering	0.9	0.3
Greater reliance on functional flexibility	5.4	6.2
Increased reliance on external suppliers	3.5	2.2
Increased inter-firm collaboration in R&D	1.6	1.7

[†] Columns add to 100.

Computer use *in the 12 months prior* to the survey date is considerably correlated with working for an establishment that downsized in the three years prior to the survey. These time periods are important. Establishment data (both establishment counts and establishment employment) show little if any correlation between downsizing and *adopting* computer-based technology in the same period. Since we are not controlling for industry and size effects here, it is not clear whether something else underlies this result, but the raw data are clear: computer users tend to work in establishments that have recently downsized. Surprisingly, computer *use* and re-engineering are not correlated. This is in contrast to the data on computer *adoption* seen in Table 2.10.

Summary

With the breadth of information it provides on technology adoption, the use of technology, innovation, and organizational change, the WES makes a significant contribution to a study of restructuring. Not only does the WES enable a study of these activities individually, it also allows us to examine how establishments have combined them and how they affect workers.

We see that just over one-quarter of establishments, accounting for about 5 percent of employment, did not innovate or introduce an organizational change or new technology in the three years prior to the survey date. The small share of employment in these establishments reflects the fact that they are, for the most part, smaller ones.

For establishments that did introduce organizational changes, downsizing, re-engineering, and greater reliance on functional flexibility carried the day. This was true for establishments of all sizes. Many establishments also relied on some change in the nature of work, increased reliance on temporary or part-time help, or flexible hours.

Almost half of establishments surveyed in the WES reported some technology adoption or innovation. Technology adoption was by far the most popular, and among technology adopters, computer-based technologies prevailed. There were nearly twice as many innovators that combined innovation with technology adoption than those that innovated exclusively. However, most establishments that adopted technology did so exclusively, without innovating. This underscores the need to carefully distinguish these concepts in public discussion of technological change.

Almost two-thirds of all workers use a computer. Computer use and innovation seem to be correlated and this might reflect the fact that computer users are concentrated in the service sectors, where a lot of new service development has taken place. Despite popular discussion about the ability of computers to increase non-standard employment relationships, the WES data show that much fewer computer users than non-users work outside of the standard Monday to Friday, 6 a.m. to 6 p.m. work week, and many computer users work at home as part of their job. Computer users are only marginally more likely to work flexible hours, but much more likely to carry out some of their duties at home.

One-third of establishments, representing 63 percent of employment, combined an organizational change with either technology adoption or innovation. There was virtually no evidence that adoption of computer-based technologies and downsizing were correlated. The innovation/downsizing relationship is more a function of establishment size. The 7.9 percent of establishments that both innovated and downsized accounted for about 37 percent of employment in establishments reporting innovation. Forty-two percent of computer users work in establishments that downsized in the three years prior to the survey, much higher than the proportion of computer non-users. Computer users were almost as likely to work in establishments that re-engineered as those who do not use computers.

The WES data show that a variety of activity characterized structural change in the early 1990s. While not all establishments were active, many were, and many combined organizational change, technological change, and innovation in different ways. But our picture of restructuring is now a little clearer. For the most part, establishments tended to combine technology adoption or innovation with some form of re-engineering. Downsizing and the *adoption* of computer-based technology were not clearly associated, but many of today's computer users do work for establishments that recently downsized. Perhaps the most important lessons in these data are that we need to be precise in our language when discussing restructuring, and that we require careful multivariate analysis to disentangle the combinations of changes undertaken by Canadian establishments.

Chapter 3 — Training, Establishment Practices, and New Technology

Darren Lauzon

This chapter explores the data on formal training offered by the Workplace and Employee Survey (WES) establishments and undertaken by WES employees. While the bulk of the data reported here is on formal training, this does not mean that *informal* training is not important. The WES collected some information on informal training pursued by employees who use computers. It will be seen that this informal training is a more significant part of training for computer users than is formal training. Taking advantage of the linked nature of the WES, we examine both the percentage of establishments offering training and the percentage of employees who report training, as they relate to many of the establishment characteristics and practices examined in other chapters of this report. We start with a discussion of training from the establishment perspective, specifically to determine what kinds of establishments are more likely to train than others. We follow with a discussion of training reported by employees, to see in what kinds of establishments employees were more likely to report training. The two perspectives often lead to different conclusions about the extent and correlates of training.

Over one-third of establishments (38.7 percent) provided some kind of formal vocational or non-vocational training in the 12 months preceding the survey date. Formal vocational training was more popular than non-vocational training (35.4 percent and 25.5 percent, respectively); establishments were able to report both and 22.1 percent did.

Over one-third of establishments (38.7 percent) provided some kind of formal vocational or non-vocational training in the 12 months preceding the survey date.

Table 3.1: Establishments Offering Formal Training

Percent offering vocational training	Percent offering non-vocational training	Percent offering both vocational and non-vocational training	Percent offering any formal training
35.4	25.5	22.1	38.7

Establishments offered many types of training (Table 3.2). A notable exception was the very low incidence of formal literacy and numeracy training (offered by less than one percent of establishments). The lack of employer-provided literacy and numeracy training does not mean that these skills are not important to establishments; rather, it supports the basic prediction of human capital theory that because these skills are applicable economy-wide, individual employers have little incentive to provide them. So at a time when literacy and numeracy are increasingly identified as

necessary for employment, these data indicate that establishments are not really a source of this important training.¹ It remains to be shown how much of this is due to the “public goods” nature of literacy training or under-investment on the part of firms.² The relatively high incidence of formal occupational health and safety training is likely due to legislative requirements because, for many establishments, such training is mandatory. The relatively low incidence of non-vocational training in decision-making, problem-solving, team-building, leadership, and communications might indicate that investment in these skills is a luxury that establishments are only able to pursue once an optimal stock of formal vocational human capital is accumulated.³



Table 3.2: Training by Type

Formal vocational	Percent of establishments	Formal non-vocational	Percent of establishments
Orientation for new employees	13.9	Group decision-making or problem-solving	4.7
Managerial or supervisory training	14.3	Team-building	6.1
Professional training	14.3	Leadership	6.8
Literacy or numeracy training	0.5	Communications	6.6
Apprenticeship training	11.4	Occupational health and safety	14.0
Sales and marketing training	10.1	Environmental protection	6.1
Computer and other office equipment training	12.6	Other non-vocational training	5.6
Non-office equipment training	4.0		
Other vocational training	11.2		

Table 3.3 indicates that there was considerable variation in formal vocational training across sectors, ranging from almost 100 percent of establishments in communication and utilities industries to 18 percent of establishments in construction.⁴ Although training incidence was lower in the construction and retail trade and commercial services industries than in communications and education and health services, this does not mean that these latter sectors were “better” providers (or users) of human capital than the others. These figures show only the incidence of establishments offering training and not the depth or intensity of that training (which could be measured, for example, by dollars invested per worker, number of workers trained, or duration of training). Also, some industry sectors can rely on established training

1 For more detail on the literacy-employment connection, see OECD, Statistics Canada. (1995). *Literacy, Economy and Society* and Human Resources Development Canada, National Literacy Secretariat and Statistics Canada. (1996). *Reading the Future: A Portrait of Literacy in Canada*.

2 A recent report by the Conference Board of Canada, entitled “The Economic Benefits of Improving Literacy Skills in the Workplace”, argues that firms can enjoy considerable private benefits from literacy training.

3 It is quite possible that “orientation for new employees” can involve occupational health and safety elements, and that managerial and professional training may in fact include components of decision-making, team-building, problem-solving, leadership, and communications training. Given that the vocational training question was asked before the non-vocational question, this possibility cannot be discounted.

4 Because the sectoral (and other) variations in formal non-vocational training are very similar, unless otherwise indicated, we focus on both “vocational” and “non-vocational” training for most of the chapter.

programs in the public education, trade, and apprenticeship systems for their supply of human capital. In other sectors, knowledge and skill is more product- and/or firm-specific, or is too new to have become established in the public training system, making investment by establishments directly benefiting from the training more economical.

Table 3.3: Training by Sector



	Percent of establishments offering formal vocational training
Logging, forestry, mining, quarries, and oil wells	50.6
Manufacturing: science-based	53.7
Manufacturing: scale-based	62.8
Transportation and storage; wholesale trade	44.9
Retail trade and commercial services	21.4
Finance and insurance	91.6
Real estate operations and insurance agents	38.0
Business services	..
Construction	18.1
Communications and other utilities	99.3
Education and health services	86.7
Manufacturing: product-differentiated	71.3
Total	35.4

Who Trains?

A strength of the WES is the broad range of data collected. Recall that 38.7 percent of establishments offered some formal training. We already saw how this training was distributed by sector. Table 3.4 shows the distribution of training by establishment size. The WES clearly supports the well-established fact that larger establishments are more likely to offer training.

These data offer support for the view that training is part of a cluster of practices that make up what might be called "high performance workplaces," characterized by innovations in how business and work are organized and how employees are compensated.



Table 3.4: Training by Establishment Size

	Formal vocational training	Percent of establishments offering:		
		Formal non-vocational training	Both formal vocational and non-vocational training	Any formal training
0-19 employees	28.0	19.8	16.3	31.5
20-99 employees	76.6	53.2	51.0	79.4
100-499 employees	92.5	79.4	78.5	93.4
500+ employees	94.9	90.4	90.0	95.3
All sizes	35.4	25.5	22.1	38.7

The chapter on organizational change shows that, for the most part, re-engineering was the dominant change undertaken by WES establishments. Other changes included increased integration of functional areas, greater reliance on temporary workers, and greater reliance on functional flexibility.⁵ Almost two-thirds (65 percent) of establishments that re-engineered in the three years preceding the survey also offered formal training, and even more (70.2 percent) of those increasing their reliance on functional flexibility also reported training (Table 3.5). Over half of those that increased the integration of functional areas within the establishment also offered training. When compared with the 38.7 percent overall training rate among WES establishments, these numbers point to a high correlation between training and common organizational changes undertaken in the early 1990s. Only those establishments reporting greater reliance on temporary workers did not seem to report training much more than the WES sample as a whole.

Table 3.6 shows that training was correlated (in some cases very highly correlated) with the work organization practices and some of the compensation practices surveyed by the WES. Almost all establishments introducing quality circles or flexible job designs also offered training. Training was associated more with gain-sharing or individual incentive compensation schemes than with group sharing arrangements. These data offer support for the view that training is part of a cluster of practices that make up what might be called “high performance workplaces,” characterized by innovation in how business and work are organized and how employees are compensated.

Table 3.5: Training and Recent Organizational Change

	Percent of establishments that introduced the organizational change	Percent of “introducing” establishments that offered training	Percent of “non-introducing” establishments that offered training
Re-engineering	31.1	65.4	27.2
Increased integration	24.7	59.7	32.2
Increased reliance on temporary work	12.9	42.5	38.3
Increased reliance on functional flexibility	26.5	70.2	28.0

⁵ “Functional areas” refer to the physical and/or organizational parts of the establishment responsible for different functions. Increased integration of these areas means either that their numbers are reduced or that existing functional areas are more closely connected. “Functional flexibility” refers to the establishment’s ability to change existing functions or add new ones in response to changes in its business environment.

Table 3.6: Training and Variable Compensation Practices and New Work Organization

	Percent of establishments that adopted the work organization or compensation practice	Percent of “adopting” establishments that offered training	Percent of “non-adopting” establishments that offered training
Productivity gain-sharing	8.6	68.4*	35.9
Individual incentive pay	21.9	64.1	31.5
Group incentive pay	3.8	43.7*	38.5
Quality circles, problem-solving teams	6.4	92.5	35.0
Flexible job design	6.7	85.1	35.4
Self-directed work teams	4.8	..	37.1

The WES surveyed several elements of business strategy. The chapter on business strategies groups these into four main groups: the product development strategies group, the cost-reduction strategies group, the human resources management strategies group, and the quality-related strategies group.⁶ The product development group focuses on research and development and breaking into new markets. There are relatively few establishments that attach high importance to these strategies, although those that do tend overwhelmingly to offer training. As might be expected, given popular perceptions and the time period of the survey, cost-reduction strategies were more popular, but for establishments reporting that these strategies are important, the likelihood of training is much lower (in most cases, lower than the 38.7 percent WES sample training rate). In fact, establishments less interested in cost-reduction strategies are more likely to train. It would make sense, given the direct relationship between human resource development strategies and skills, that establishments claiming this group of strategies is important would be much more likely to offer training. For the most part, this is true. However, only establishments claiming that these have “high” or “medium” importance to their overall business strategy have a higher training rate than the complete WES sample. Finally, there does not appear to be a strong association between training and quality-related strategies.

It seems that, consistent with our expectations concerning the “knowledge economy,” establishments exploring new ways of producing and selling, and new markets in which to sell, are much more likely to train. Establishments focusing on cost-reduction are less likely to offer training.

⁶ Refer to Chapter 4 for more information on the survey question and how the items were grouped and scaled.

**Table 3.7: Training and Business Strategies⁷**

Business strategy group	Level of importance	Percent of establishments citing a business strategy cluster by level of importance	Percent of establishments citing a business strategy cluster that offered training
Product development	High	12.1	82.3
	Medium	18.3	56.6
	Low	30.8	27.6
	None	38.8	25.5
Cost-reduction	High	17.9	31.2
	Medium	38.9	46.8
	Low	28.2	37.8
	None	15.0	28.2
Human resource, management	High	19.7	69.2
	Medium	38.2	45.3
	Low	29.1	19.6
	None	13.0	15.5
Quality-related ⁸	High	67.3	41.7
	Low	32.7	32.5

Establishments facing only local or provincial competition (“sub-national” competition) tend not to train. But if local competition is combined with competition from national and international sources, training rates are higher.

Before looking in more detail at technology and training, we consider the geographical source of competition faced by trainers.⁹ The WES collects data on four geographical sources of competition (local, provincial, national, and international—specifically, the U.S., Mexico, Europe, Pacific Rim, or other areas). We group these here into “sub-national”, “national”, and “international.” The majority of establishments face *only* sub-national competition, and they are the least likely to offer training, much less so than the WES sample as a whole. However, many establishments (about 9 percent) face both national and sub-national competition, and another 8 percent face competition from all three sources; both of these groups are much more likely to offer training.¹⁰ We do not control for size here, so one must be careful about making direct claims about the relationship between training and “global” competition. It is almost certain that the establishments reporting competition from all three areas are larger establishments, already shown to have a high training rate.

⁷ For a definition of which surveyed strategies were assigned to which grouping, see Chapter 4. Establishments could cite multiple strategies.

⁸ The very small cell counts for “quality-related strategies” allow us to examine only the “high” and “low” intensity groups. See Chapter 4.

⁹ There is no distinction between import or export competition.

¹⁰ The number of establishments not reporting sub-national competition but reporting competition from either or both national and international sources was too small to make conclusive judgements with respect to training.

Table 3.8: Training and Sources of Competition

	Percent of establishments facing competition from these geographical areas	Percent of establishments facing competition from these geographical areas that offered training
Sub-national only	64.1	25.4
Sub-national and national	9.4	70.3
Sub-national, national, and international	8.3	76.2

Source: Author's calculations.

No one would be surprised to see a correlation between training and technological change. The WES asks several questions on technology adoption *and* innovation over the three years preceding the survey date. This allows analysts to be precise about just what *kind* of technological activity is correlated with training.

Table 3.9 provides detail on training and the adoption of new computer-based technologies and innovation. Clearly, establishments that introduce some form of computer-based technology have a higher training rate than the 38.7 percent of WES establishments overall. However, most of that training is associated with the introduction of computer-*assisted* technologies, the adoption of which is much less common than actual computer hardware or software. For other, non-computer-based technologies we see that the training rate is higher than 38.7 percent but still quite low compared to adopters of computer-assisted technologies. Though the lower training rate for hardware and software adopters may be surprising at first, later in this chapter we will see that computer *users* rely less on formal training than on informal training and self-learning.

Looking at innovation, we see a high correlation between training and product innovation: almost two-thirds (62.6 percent) of all product innovators also offer training. Process innovators were less likely than product innovators to offer training, but still more likely than the average WES establishment.

The WES clearly shows that, to a large extent, all technological change — including the adoption of technologies and innovation in what is produced and how — is associated with the provision of training.



The WES clearly shows that, to a large extent, establishments implementing a new technology or introducing an innovation have a higher probability of training.

**Table 3.9: Training, Technology, and Innovation**

	Percent of establishments that innovated or adopted new technology	Percent of adopting or "innovating" establishments that offered training	Percent of "non-adopting" or "non-innovating" establishments that offered training
Introduction of new hardware or software	32.4	54.5	31.0
Introduction of other computer-assisted technology	6.4	75.6	36.2
Introduction of other technology	12.9	57.0	36.0
Product innovation ¹¹	16.7	62.6	33.9
Process innovation	10.9	54.6	36.7

Some of the factors seen to be associated with the training offered by establishments are less associated with the proportion of employees being trained.

The WES data show that we need to be careful about how we measure the incidence and scope of training. Intensity of training, as measured by the proportion of workers receiving training or the duration of that training, may be a better measure.

Who Gets Trained?

The previous section illustrated what kind of establishments offer training. This section takes advantage of the linked nature of the WES to explore how many employees surveyed in these same establishments also reported receiving formal training. Some differences in the training story emerge.

Overall, some 41.1 percent of employees reported receiving job-related training over the 12-month period preceding the survey date, and, as other studies have found, this was directly correlated with establishment size (Table 3.10).

**Table 3.10: Employees Trained by Establishment Size**

	Percent of employees reporting training
0-19 employees	26.9
20-99 employees	31.1
100-499 employees	45.4
500+ employees	48.3
All sizes	41.1

¹¹ In the services producing sector, a product innovation is the "introduction of a new service" and a process innovation is "a change in existing services." While one might rightly question whether this really means "process" innovation, the preamble to the question on the survey instrument makes the distinction much more clear. We assume that respondents read "change in existing services" in light of the preamble to the question.

Recall the sectoral distribution of establishments that offered some formal (vocational) training. Table 3.11 shows the distribution, by industry, of *employees* reporting job-related training. The “high incidence” sectors, communication and utilities and finance and insurance, train more than half of their employees (63.1 and 54.5 percent respectively). Some differences are apparent in the manufacturing sector. Science-based manufacturing trains just over half of its employees but has a relatively low proportion of establishments reporting that they offer training. On the other hand, in product-differentiated manufacturing, less than one-third of the workforce reported receiving training, although a relatively high proportion of establishments offer training. These data suggest that we need to be careful how we measure the incidence and scope of training.

Table 3.11: Establishments Offering Training and Employees Trained by Sector



	Percent of establishments offering formal vocational training	Percent of their employees reporting training
Logging, forestry, mining, quarries, and oil wells	50.6	42.6
Manufacturing: science-based	53.7	51.4
Manufacturing: scale-based	62.8	33.2
Transportation and storage; wholesale trade	44.9	37.6
Retail trade and commercial services	21.4	15.7
Finance and insurance	91.6	54.5
Real estate operations and insurance agents	38.0	41.9
Business services	..	45.7
Construction	18.1	18.3
Communications and other utilities	99.3	63.1
Education and health services	86.7	52.4
Manufacturing: product-differentiated	71.3	29.2
Total	35.3	41.1

Table 3.12 shows the proportion of employees reporting training according to the characteristics of the establishments in which they work. Recall that establishments offering group incentive systems were less likely to train than those offering individual incentive pay or productivity gain-sharing schemes. However, the proportion of employees receiving training is higher in establishments offering group incentive plans than in the latter two. The very high incidence of establishments that use quality circles, flexible job design, or self-directed work teams and offer training is matched by the higher proportion of workers in these establishments reporting training. But the degree to which training is associated with these practices is much less apparent from these employee data.



Table 3.12: Employees Trained by Workplace Characteristics

		In establishments reporting:	Percent of employees reporting training
Compensation Schemes	Productivity gain-sharing		29.4
	Individual incentive pay		42.2
	Group incentive pay		53.8
Work Organization	Quality circles, problem-solving teams		51.2
	Flexible job design		45.9
Organizational Change	Self-directed work teams		46.9
	Re-engineering		42.4
	Increased integration		48.0
	Greater reliance on temporary work		44.2
	Greater reliance on functional flexibility		44.9
Business Strategies	Product development	High	48.3
		Medium	35.2
		Low	31.4
		None	41.3
Cost-reduction	Cost-reduction	High	41.7
		Medium	39.3
		Low	40.6
		None	54.2
Human resource management	Human resource management	High	51.8
		Medium	28.2
		Low	34.8
		None	2.2
Sources of Competition	Quality-related	High	42.2
		Low	32.6
Technological Change and Innovation	Sub-national only		34.6
	Sub-national and national		51.4
	Sub-national, national, and international		32.5
Technological Change and Innovation	Introduction of new hardware or software		46.1
	Introduction of other computer-assisted technology		44.2
	Introduction of other technology		43.4
	Product innovation		47.5
	Process innovation		53.2

Surprisingly, there was virtually no variation in the proportion of employees receiving training across various organizational changes. In fact, while 64 percent of establishments that re-engineered reported offering training, only about 42 percent of their employees reported receiving any job-related training, just slightly above the average proportion of all WES employees trained.

For companies reporting an emphasis on different business strategies, a mixed story emerges. Workers in establishments placing importance on product development strategies tend to be trained. Workers in establishments placing a high level of importance on cost-reduction strategies tend surprisingly to train at about the same rate as all workers in the WES. In the case of human resource management strategies, only workers in establishments placing very high importance on these practices tend to be trained at a high rate.¹²

Regarding competition from different geographical sources, recall that establishments facing competition from a combination of sources tended more to offer training. Table 3.12 bears this out to a limited extent. Workers in establishments facing only sub-national competition tended not to report training, whereas about half of workers in establishments reporting sub-national and national competition reported training. But contrary to the story from the establishment perspective, fewer workers in establishments facing competition from all three sources reported receiving training.

Finally, technological change, be it in the form of new technology adoption or product or process innovation, tends to be correlated with the proportion of workers being trained. There is, however, little variation between the proportion of workers being trained in establishments adopting computer-based technologies and those adopting other, non-computer-based technologies. But, as indicated at the beginning of this chapter, these results are for *formal* training. The WES employee survey directly asked users of computers and other technologies what forms of training were most important. Table 3.13 shows that the majority (almost two-thirds) of employees considered self-learning and informal training to be the most significant means of learning to use computers.

¹² The “none” categories need to be interpreted carefully. These include establishments citing that all (or almost all) of the strategies within the cluster are either “not important” or “not applicable.” The case of “not applicable” is almost surely qualitatively different from that of “not important.”



Table 3.13: Means of Learning to Use Computers

	Percent of computer users
Formal training ¹³	33.9
Informal training and self-learning	66.1

Some of the factors associated with training, considering the proportion of establishments offering the training, are less associated with the proportion of employees being trained. This was especially true for establishments facing competition from sub-national, national, and international sources and for the rate of training by business strategy. Because many of the establishment results are artifacts of establishment size, *intensity* of training, as measured by the proportion of workers receiving training or the duration of that training, may be a more illuminating measure.

Summary

The WES collected a wealth of information on establishments and their workers. Much of this data confirms and expands on previous studies of training. We see that large establishments are more likely to offer training, and workers in large establishments are more likely to receive it. The dual workplace-worker perspective of the WES clearly shows how different the incidence of training can be, depending on the perspective taken. A relatively low proportion of science-based manufacturing establishments reports offering training, but a relatively high proportion of their workers reports receiving it. Similarly, a relatively high proportion of product-differentiated manufacturing establishments reports offering training, while a relatively low proportion of their employees reports being trained.

Both perspectives of the survey do confirm that training is correlated with many of the changes characteristic of the new “knowledge-based” economy. Training is prevalent in establishments that seek greater functional flexibility, innovate new products or services, and organize work in new ways that emphasize problem-solving and decision-making. To some extent, business strategies matter. Establishments focusing on product development strategies tend to offer training and their workers tend to report being trained. The same is true for establishments placing a high level of importance on human resource management strategies. The association between training and the reported importance of cost-reduction strategies is much less clear. Establishments placing high importance on these strategies tend not to train, but workers in these establishments seem as likely to report training as the average WES worker.

13 “Formal training” here includes the categories “courses paid for by employee” (4 percent), “university or college courses” (4 percent), and “courses paid for by employers” (25 percent).

The impact of “globalization” is also mixed. From the establishment perspective, it seems less important whether the competition is international or local than whether the competition is from a combination of sources. However, workers in establishments facing international competition in combination with national and sub-national competition are less likely to report training. This is almost certainly an establishment size effect; large establishments offer training, but a relatively small share of their workforces actually receives it.

Finally, the WES provides some interesting insight into the nature of technology, innovation, and training. Technology adoption and innovation are often used interchangeably to characterize the “knowledge” economy. Chapter 2 shows that these are quite distinct features of the economy and, to a large extent, the data on training confirm that. There is surprisingly little evidence that the implementation of computer-based technological change and training are highly correlated; it is specifically with the non-hardware/software-related, computer-*assisted* technologies like optical scanners or some advanced manufacturing technologies that the correlation seems strongest, and this is mostly seen in the proportion of establishments offering training. But formal training is not all, or even the most important part of, skill investment. The WES employee data confirm what anecdotal evidence has already indicated: informal training and self-learning are particular features of training induced by computer use.



Chapter 4 — Business Strategies and Competition

Marie Drolet

This chapter focuses on business strategies and competition. The Workplace and Employee Survey (WES) provides information on the relative importance of a number of specific business strategies in an establishment's overall business operations. Using the data from the WES, the analysis in this chapter establishes a connection between an establishment's business strategies, the characteristics of its workers, and other establishment attributes. The WES also looks at the competition an establishment faces in its most important product/service market. The various dimensions of competition include regional competition, number of competitors, and relative price level. We can thus examine the relationship between these and establishments' characteristics and the outcomes for workers.

The WES contains a wealth of information on both the establishment and the worker. The goal of this chapter is not to measure the dependence of business strategies or competition on a number of variables. Rather, the goal is to show the association between the relative importance of business strategies or competition, the types of establishments that adopt the strategies or face competition, and the characteristics of the workers employed in these establishments.

Business Strategies¹

Each WES respondent was asked to indicate the relative importance of the following factors (by marking them as not important, slightly important, important, very important, crucial, or not applicable) in their establishment's general business strategy:

- Undertaking research and development
- Developing new products/services
- Developing new production/operating techniques
- Expanding into new geographical markets

¹ For analytical purposes, the business strategy portion of the chapter uses a sample of 680 establishments and 1,797 workers. Establishments and workers not belonging to the chosen 12 industry/province combinations were excluded. The survey is not representative of all establishments and workers in the economy. The "workforce" refers to the employment estimate of the industry/province combinations that were selected in the survey. The concept of "establishment" used throughout this chapter differs slightly from that of the business register. It was necessary to divide a small sub-sample of establishments into workplaces. For these units, we use the term "establishment" to refer to the workplace throughout this chapter. The unit of analysis is the location/workplace in which the survey was administered.

- Total quality management
- Improving product/service quality
- Reducing labour costs
- Using more part-time, temporary, or contract workers
- Reducing other operating costs
- Reorganizing the work process
- Enhancing labour-management cooperation
- Increasing employees' skills
- Increasing employee involvement/participation
- Improving coordination with customers and suppliers

For analytical purposes, business strategies included in the WES pilot were regrouped under four main classifications:

Product development strategies include undertaking research and development, developing new products/services, developing new production/operating techniques, and expanding into new geographical markets;

Cost-reduction strategies comprise reducing labour costs, using more part-time, temporary, or contract workers, and reducing other operating costs;

Human resource management strategies embrace total quality management, reorganizing the work process, enhancing labour-management cooperation, increasing employees' skills, and increasing employee involvement/participation; and

Quality-related strategies include improving product/service quality and improving customer/supplier coordination.

In order to determine the relative importance of a cluster of business strategies, an index for each classification of strategies was created. This involved assigning a value in the range of 0 to 1 to each business strategy in a particular cluster, based on the reported importance of the strategy in each establishment's overall business plan.² The values were then summed across a particular grouping of strategies (as defined above) so that establishments could be categorized according to the intensity of their use of the broader strategy types. For instance, if an establishment reported that undertaking research and development, developing new products/services, developing new production techniques, and expanding into new geographical markets were all crucial or very important, then the sum of the values associated with these ratings would be 4 (out of a maximum score of 4), and the establishment would be considered a highly intensive user of product development strategies. Likewise, if an establishment reported that all components of product development strategies were not applicable or not important (the sum of the values giving the establishment a score of 0/4), then

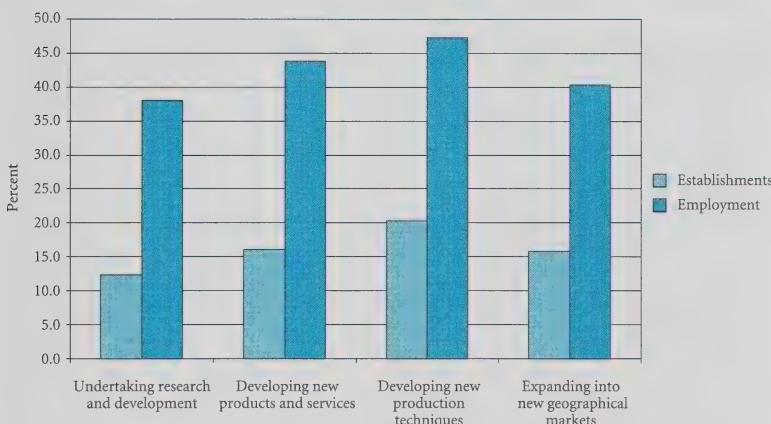
² If an establishment reported the strategy as crucial or very important, the strategy was given a value of 1; if the strategy was deemed important or slightly important, the strategy was given a value of 0.5; if the strategy was not important or not applicable, it was given a value of 0.

the establishment would be considered a non-intensive user of those strategies. The majority of the analysis that follows focuses on the distinction between highly intensive and non-intensive users of a cluster of business strategies.³

Product Development Strategies

The “knowledge-based” economy extends beyond the adoption of technological change to include research and development, the development of new production techniques, and the development of new products and services. Significant proportions of establishments consider product development business strategies such as undertaking research and development (12.3 percent), developing new products and services (16.1 percent), developing new production techniques (20.3 percent), or expanding into other geographical markets (15.8 percent) imperative to their overall business strategy. These establishments employ 38 to 47 percent of the workforce.⁴

Figure 4.1: Product Development Strategies Considered Very Important or Crucial



According to the product development index,⁵ 12.1 percent of all establishments consider all product development strategies crucial or very important. About half of the establishments located in the science-based and product-differentiated manufacturing industries rank all product development strategies as essential to their overall business strategy. Roughly two out of five establishments do not use any product

Establishments differ in the intensity of their use of product development strategies.

³ Every effort was made to choose ranges for the intensity of use that made the most “sense.” It should be noted that the results that follow are not sensitive to the intensity cutoffs; that is, tests were run to ensure that the same qualitative conclusions hold regardless of the cutoff values chosen by the author.

⁴ The “workforce” refers to the employment estimate of the industry/province combinations.

⁵ The range of scores for the product development index is as follows:

Not important or slightly important	0-0.5
Low	1-1.5
Medium	2-2.5
High	3-4

The same qualitative conclusions hold when the score ranges are altered.

development strategies. The least intensive users of product development strategies are retail and commercial services operations, real estate agencies, and construction establishments.



**Figure 4.2: Product Development Strategies Index
(percent of establishments)**

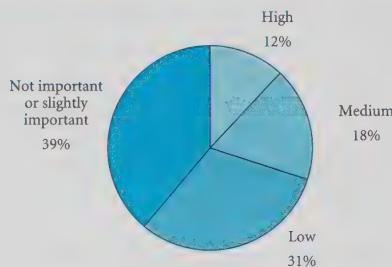


Table 4.1: Intensity of Product Development Strategy Use

Industry	Percent of establishments in industry whose product development index is:	
	High	Not important or slightly important
Overall	12.1	38.9
Logging, forestry, mining, quarries, and oil wells	8.0	30.2
Manufacturing: science-based	54.9	5.2
Manufacturing: scale-based	31.7	17.1
Transportation and storage; wholesale trade	7.8	24.5
Retail trade and commercial services	12.6	54.7*
Finance and insurance	17.7	25.5
Real estate operations and insurance agents	2.9	61.8
Business services	..	..
Construction	3.3	43.2
Communications and other utilities	33.2*	..
Education and health services	33.9	34.5
Manufacturing: product-differentiated	49.6	7.0
Establishment size		Percent of establishments in size group whose product development index is:
		High
1-19 employees	8.6	43.3
20-99 employees	30.8	12.9
100-499 employees	44.9	7.4
500+ employees	32.7	6.6

Roughly 45 percent of establishments employing between 100 and 499 workers, as compared to 9 percent of establishments employing less than 20 workers, regard all product development business strategies as very important or crucial to their overall business strategy. Alternatively stated, the relative importance of product development strategies declines as establishment size decreases: roughly 43 percent of establishments with less than 20 workers, compared with only 7 percent of establishments with 500 or more employees, do not consider any of the product development strategies integral to their overall operations.

About one in six establishments that employ product development strategies reports charging higher than average prices for its goods and services. Product developers may charge higher prices in order to recoup the expenses related to the implementation of these strategies. The local and provincial markets are the most important sales markets for both product developers and non-users of product development strategies. However, a significant proportion of product developers cite the Canadian, American, and international markets as their most important market. Establishments must consider the strategies of their competitors when designing their business strategies. All establishments cite the importance of local and provincial competitors to their own business operations, but product developers are more likely to note the importance of competition from national, American, and international establishments.

Establishments that consider product development business strategies integral to their overall business operations tend to be larger establishments.

Establishments that rely on product development strategies have unique establishment characteristics.

Table 4.2: Product Development Index and Establishment Characteristics



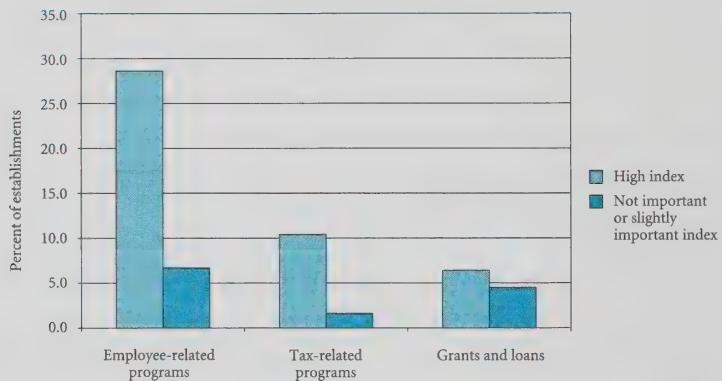
Establishment characteristics	Percent of establishments in product development index with establishment characteristic	
	High	Not important or slightly important
Charge higher prices	16.5	12.3
Most important sales market		
Local/provincial	50.8	88.5
Canada	14.5	2.2
United States	14.2	0.2
International	11.5	..
Other	9.1	9.1
Significant competition from		
Local firms	59.1	56.6
Provincial firms	57.5	10.7
Canadian firms	37.3	0.7
American firms	34.6	0.3
Other international firms	11.7	0.2

Note: The column entitled "Significant competition from" should not sum to 100. In the WES respondents were asked about the importance of competition from each geographical region separately. The respondents were not asked to rank regions from most significant competition to least.

Product developers are more likely to participate in government-sponsored programs than establishments that do not use any product development strategies.

About 29 percent of product developers make use of employee-related programs such as wage subsidies, training subsidies, other training programs, and employee exchange programs, compared with only 7 percent of non-users. About one in ten product developers uses tax-related programs such as research and development tax credits, accelerated depreciation allowances, property tax relief, and other tax-relief programs. There is little difference between establishments that engage in product development strategies and those that do not in their use of grant and loan programs such as research and development grants, loan guarantees, and other operating grants.

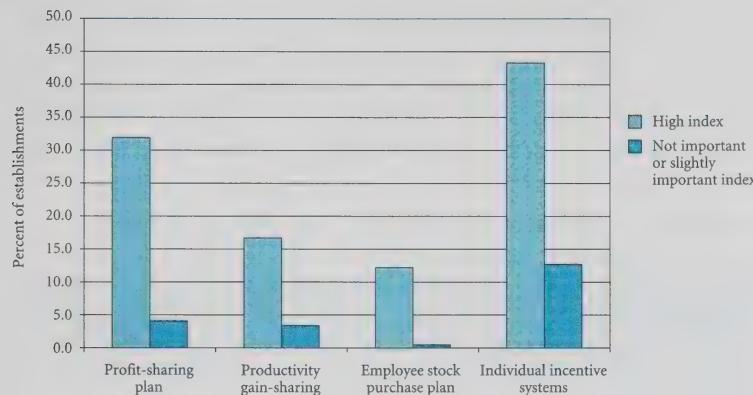
Figure 4.3: Product Development Index and Use of Government-Sponsored Programs



Flexible compensation practices that relate employee remuneration to the economic performance of the establishment are more common in establishments that consider product development strategies integral to their overall business strategy.

About one in three product developers provides profit-sharing plans, one in six employs productivity gain-sharing plans, and one in eight uses employee stock purchase plans. Less than 5 percent of non-users of product development strategies employ these alternative compensation schemes. About 43 percent of product developers use individual incentive schemes, compared to roughly 13 percent of non-users. By allowing employees an opportunity to profit directly from the establishment's performance through greater financial incentives, labour-management work arrangements may become more cooperative, more motivated, and more productive. As well, these programs may have other benefits, such as greater stability in employment, since wages would be more responsive to fluctuations in product demand or services. However, it should be noted that many of these observations may be attributable to an establishment size effect.

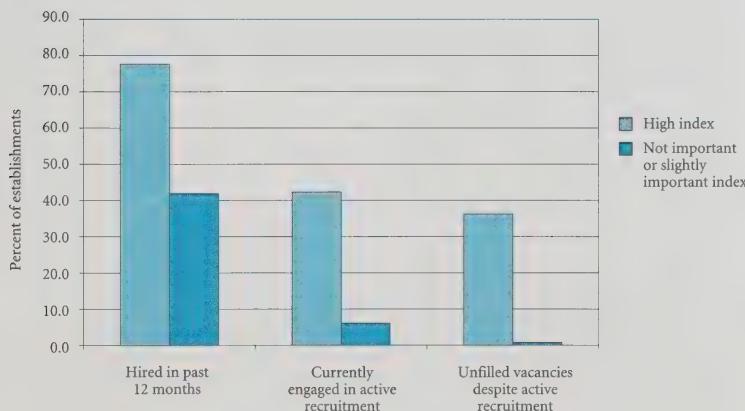
Figure 4.4: Product Development Index and Alternative Compensation Practices



About 78 percent of establishments that deem all product development strategies significant, compared to roughly 42 percent of non-users, hired new employees in the past 12 months. Almost 42 percent of product developers are currently engaged in active recruitment. Unfilled vacancies exist for one-third of intense product developers, despite active recruitment. Possible explanations for unfilled vacancies are that applicants were too few in number, that they lacked educational requirements or job experience, or that most applicants declined job offers.⁶

Product developers are more likely to have hired new employees and to be currently engaged in active recruitment.

Figure 4.5: Product Development Index and Hirings and Vacancies



⁶ For a more detailed discussion on hirings and vacancies, please consult Chapter 5.

**Establishments that rely
heavily on product
development strategies
employ a more skilled and
more educated workforce.**



Over one-quarter of the workers employed by product developers are university educated; almost half have received training in the past 12 months,⁷ and about half are managers or professionals. As well, just over half of the workers employed in these establishments have received at least one promotion. When asked to rank the relative importance of factors in earning their promotions, only 8.5 percent of workers in establishments engaged in significant product development cited seniority as a crucial or very important factor, compared to 24.2 percent of workers in establishments that do not adopt any product development strategies. Interestingly, almost one-quarter of workers in establishments that consider all product development strategies crucial have worked in the same establishment for over 20 years.

Table 4.3: Product Development Index and Worker Characteristics

Characteristic	Percent of workers in establishments whose product development index is:	
	High	Not important or slightly important
University educated	28.3	19.0
20+ years in same establishment	22.4	16.7
Unionized	33.9	33.1
Managers and professionals	45.7	32.6
Promoted	54.4	27.5
Trained	48.3	41.3

**Establishments engaging in
product development
strategies demand a more
skilled and educated
workforce and also pay
higher wages.**

Product developers may also offer higher wages to reduce absenteeism and turnover. The wealth of information in the WES database permits an examination of the potential role of product development strategies in the wage determination process.

The wages of women employed in establishments that consider product development strategies essential are 17.2 percent higher than those of comparable women employed in establishments that deem all product development business strategies not important or slightly important.⁸

⁷ Interestingly, 81 percent of product developers offer formal vocational training, compared to 21.4 percent of non-users of product development strategies. Vocational training includes orientation for new employees, managerial/supervisory training, professional training, literacy or numeracy training, apprenticeship training, sales/marketing training, and training on computers and other office and non-office equipment.

⁸ This is based on a semi-log wage equation regression model, where log hourly wages are regressed on age, education, job tenure, industry, union status, part-time status, establishment size, and the product development intensity index. Regression coefficients measure the constant relative change in wages for a given absolute change in the explanatory variables. The coefficients on the high product development user index dummy variables were all significant at the 1 percent level. Interestingly, the wage differential for women decreases monotonically as intensity use declines. This is consistent with our a priori expectations.

For men, the impact of product development strategies on wages is less obvious. For the full specification of the model (as outlined in footnote 8), men working in establishments that consider all product development strategies essential to their business operations earn slightly more than comparable men employed in establishments that are non-users of the strategies. However, the wage differential is not statistically significant.⁹

In general, establishments that consider all product development strategies essential tend to

- be larger establishments
- charge higher than average prices
- be more likely to have the majority of their assets held by foreign interests
- have a broader market base
- participate in government sponsored programs
- employ alternative compensation schemes
- have hired workers in the past 12 months
- be currently engaged in active recruitment
- have unfilled vacancies despite active recruitment.

Workers in these establishments

- are more skilled
- are more educated
- have received training more often
- have longer job tenure
- have been promoted more often
- earn higher wages.

Human Resource Management Strategies

Differences in perspective on human resources were examined using variables that reveal the importance an establishment gives to labour skills, to industrial relations, and to investments in enhancing worker skills. About two in five employers believe that total quality management is integral to their business operations¹⁰; one in six employers finds it critical to its business success to reorganize the work process; one in five establishments finds enhancing labour-management relations crucial to its success; almost one in three employers cites improvements to employee skills or

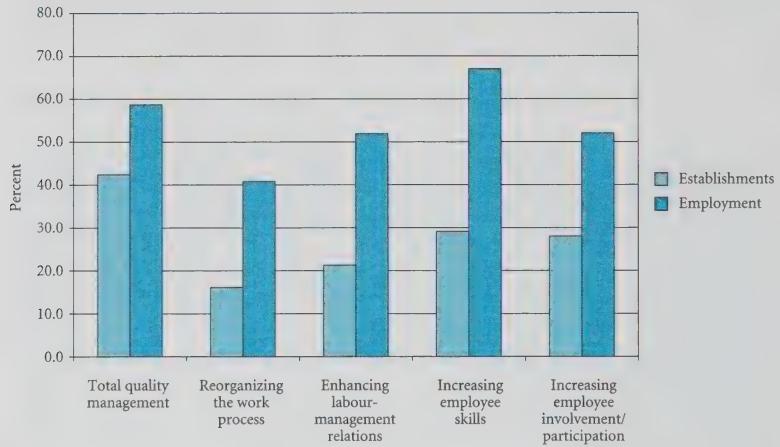
**Establishments differ
in their use of human
resource strategies.**

⁹ For men, the results are sensitive to the specification chosen. For example, a high product development index may have a positive or negative impact on the wages of male workers. However, the model specification outlined in footnote 8 yields a positive wage differential. Although the regression coefficient attributable to men employed in establishments that are intense users of product development strategies is statistically insignificant, the result still makes intuitive sense; that is, the wage differential is still positive.

¹⁰ Total quality management is a philosophy whereby all employees, not just employees specifically assigned to the task, are encouraged to search for new ideas and improvements, in the belief that employees will be more satisfied and productive.

increases in employee involvement strategies to be a fundamental component of its overall business strategy. Just over half of workers are employed in establishments that consider improvements to labour-management relations, to worker skills, and to employee participation integral to their overall business strategy.

Figure 4.6: Human Resource Strategies Considered Very Important or Crucial



The human resource management strategies index¹¹ reveals that one in five establishments reports that reorganizing the work process, enhancing labour-management relations, increasing employee skills, increasing employee involvement, and participating in total quality management schemes are all crucial or very important to its business operations. About 90 percent of establishments in the finance and insurance industry and in the communications industry are intensive users of human resource strategies. Interestingly, one in eight establishments also reports that none of these strategies is important or crucial. There is a relationship between establishment size and the perceived importance of human resource management strategies: as the number of employees in an establishment increases, the establishment is more likely to be considered an intensive user of human resource management strategies.

11 The range of scores for the human resource management index is as follows:

Not important or slightly important	0-0.5
Low	1-2
Medium	2.5-3.5
High	4-5

The same qualitative conclusions hold when the score ranges are altered.

**Figure 4.7: Human Resource Management Strategies
(percent of establishments)**

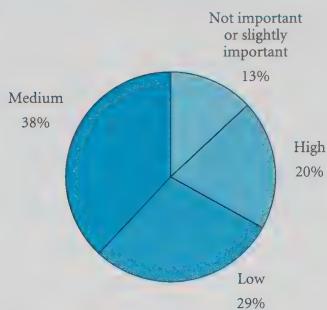


Table 4.4: Intensity of Human Resource Management Strategies Use



Industry	Percent of establishments in industry whose human resource management index is:	
	High	Not important or slightly important
Overall	19.7	13.0
Logging, forestry, mining, quarries, and oil wells	17.4	7.0
Manufacturing: science-based	32.5	2.4
Manufacturing: scale-based	37.9	13.9
Transportation and storage; wholesale trade	15.8	8.0
Retail trade and commercial services	16.1	27.4*
Finance and insurance	82.8	..
Real estate operations and insurance agents	6.2	16.2
Business services	..	..
Construction	14.2	14.0
Communications and other utilities	91.9	..
Education and health services	47.5	9.9
Manufacturing: product-differentiated	38.7	2.8
Establishment size	Percent of establishments in size group whose human resource management index is:	
	High	Low
1-19 employees	16.7	32.6
20-99 employees	33.5	8.1
100-499 employees	53.8	6.3
500+ employees	46.4	2.2

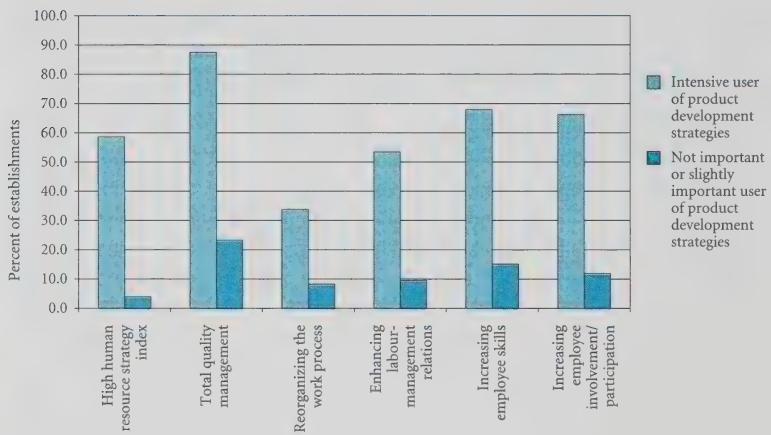
Note: For establishment size group, the incidence of intensity use is reported for the “high” and the “low” groups. The numbers were too small to report for the “not important or slightly important” group.

Product developers invest in human resource management strategies.

There are significant differences between the attitudes of establishments that do and those that do not adopt intensive product development strategies when it comes to human resource management strategies. Roughly three in five intensive product developers find all human resource management strategies crucial or very important to their overall business strategy, compared with only 6 percent of non-users of product development strategies. Examining the components of the human resource index shows that 68 percent of product developers value increasing employee skills. This is consistent with the idea that establishments that invest in increasing their employees' skills will be more able to keep pace with new knowledge and rapidly changing technology. Product developers are not only concerned with the skills of their employees, but they also tend to be occupied with improving labour-management relations: 66 percent rate employee involvement/participation and 91 percent cite total quality management strategies as essential to their business operations.



Figure 4.8: Product Development Strategies and Human Resource Management Strategies



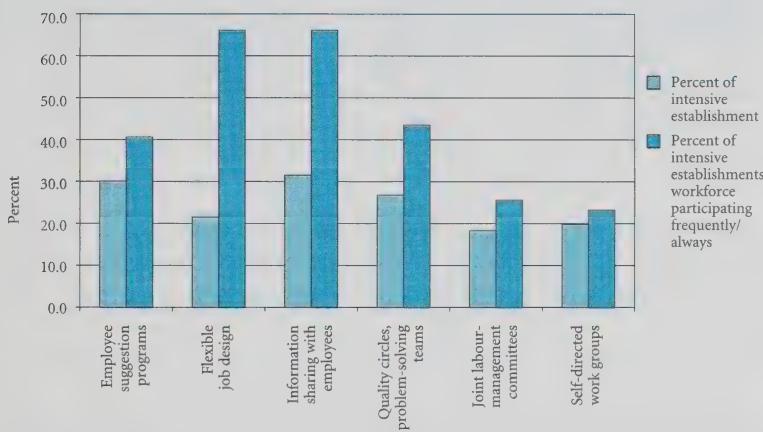
Establishments that consider all human resource strategies important or crucial tend to adopt more progressive work organization practices.

About one in three establishments that consider all human resource management strategies important or crucial uses employee suggestion programs and/or provides information-sharing sessions with employees on issues such as the establishment's performance, wages, and technological or organizational change; one in four establishments employs quality circles and problem-solving teams; and one in five establishments adopts flexible job design practices, organizes consultative joint labour-management committees and/or employs self-directed work groups.¹² Employees were asked about their participation in decisions regarding the workplace. About 43 percent of employees in establishments with a high human resource

¹² Flexible job design includes job rotation or job enrichment/redesign (increased skill, variety, or autonomy of work). Responsibilities of teams or circles are limited to specific areas such as quality or flow of work. Self-directed work groups are mini-enterprise work groups that have a high level of responsibility for a wide range of decisions and tasks.

management index participate always or frequently in employee suggestion programs and quality circles or problem-solving teams. Roughly two-thirds of employees in these establishments always or frequently partake in flexible job design and information-sharing sessions, and around one-quarter participate always or frequently in joint labour-management committees and self-directed work groups. Almost none of the establishments that consider all human resource strategies not important participate in these alternative work organization practices.

Figure 4.9: Intensive Human Resource Establishments and Progressive Work Organization Practices



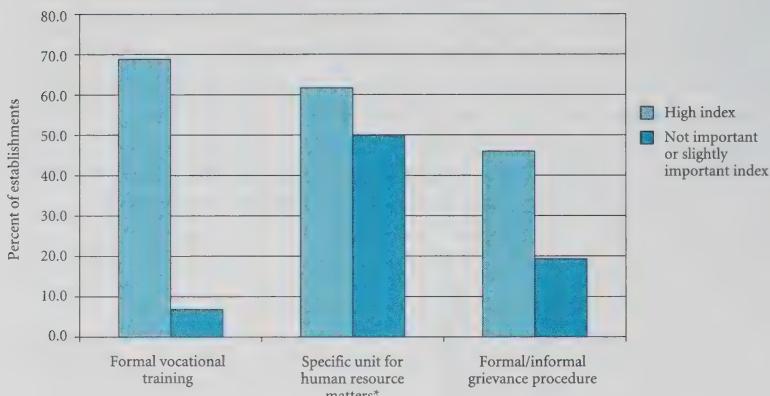
About two in three establishments that employ all human resource management strategies offer their employees formal vocational training, compared with only 7 percent of establishments that do not consider any human resource management strategies important.¹³ This is not a surprising finding since three in four establishments that perceive all human resource strategies essential to their overall business strategy cite improving employee skills as an integral component of their general operations. Interestingly, three in five of these intensive human resource establishments have a specific unit or person responsible for human resource matters, compared with only 35 percent of establishments with a low human resource management index. About half of establishments that attribute a greater importance to human resource management strategies have a formal/informal grievance or complaint system for employees, whereby the final authority to settle grievances or complaints rests with either management, or a combination of management, labour-management committees, and/or an outside arbitrator. Only one in five establishments that do not value human resource management strategies has a formal/informal grievance or complaint system.

Establishments that rely on human resource management strategies have unique establishment characteristics.

¹³ For a more detailed description of establishment training, please consult Chapter 3.



Figure 4.10: Human Resource Index and Establishment Characteristics



Establishments that perceive human resource management strategies as an integral component of their overall business strategy are more likely to offer non-wage benefits packages to their employees.

About half of all intensive human resource establishments offer pension plans, life insurance, supplemental medical benefits, and/or dental care benefits to their workers and about one in four offers group RRSPs and supplemental benefits to employment insurance (e.g., for maternity or layoff). By offering generous deferred compensation packages, establishments may reduce costly turnover or absenteeism, improve work incentives, and ameliorate the overall work atmosphere and the job satisfaction of their workforce. About one in six establishments that do not consider human resource management strategies important offers these benefits to its permanent, full-time employees. One should be very careful in the interpretation of these numbers. The results may reflect an establishment size effect: establishments that practise human resource management strategies are generally larger establishments and larger establishments are more likely to offer benefits. The same argument may be made for an industry effect.¹⁴

14 For these reasons, it is preferable to perform multivariate analysis to control for these effects.

Table 4.5: Human Resource Index and Provision of Worker Benefits

Benefits to full-time permanent employees	Percent of establishments in human resource management category	
	High	Not important or slightly important
Pension plan	47.2	14.3
Life/disability insurance	57.5	14.6
Supplemental medical insurance	55.8	14.6
Dental care	51.2	14.6
Group RRSP or savings plan	28.2	14.6
Supplemental UI benefits	22.8	4.9

Workers in establishments that value human resource management strategies tend to have a higher incidence of unionization than workers in establishments that rank the relative importance of human resource strategies very low. As well, employees in establishments that value human resource strategies tend to be promoted more often and are more likely to receive training. Roughly two-thirds of workers in establishments that emphasize human resource strategies have their performance formally appraised. Formal appraisals may provide incentives for workers to be productive and cooperative and may facilitate communication between labour and management.



Different emphases on human resource management strategies are associated with different worker arrangements.

Table 4.6: Human Resource Index and Worker Characteristics

Characteristic	Percent of workers in establishments whose human resource index is:	
	High	Low
Unionized	38.7	22.5
Promoted	50.9	35.1
Performance appraised	63.3	50.2
Received training	51.8	34.8



In general, establishments that value human resource management strategies

- are product developers
- employ progressive work organization practices
- offer formal vocational training
- provide formal/informal grievance procedures
- bestow more generous non-wage benefits
- adopt alternative work arrangements
- undertake formal performance appraisals.

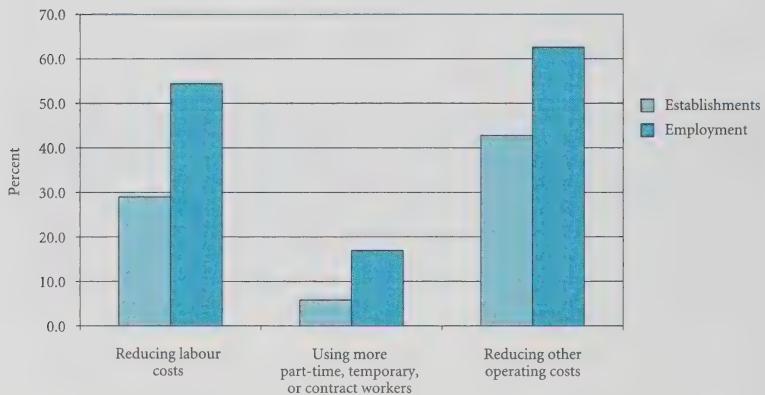
Many workers in these establishments are more likely to

- be unionized
- be promoted at least once
- receive formal appraisals
- work flexible hours
- participate in progressive work organization practices.

Cost-Reduction Strategies

Many establishments are concerned with reducing overall operating expenditures: 29.1 percent of establishments list reducing labour costs and 42.3 percent of establishments cite reducing other operating costs as crucial or very important to their overall business strategy. These businesses employ between 55 percent and 63 percent of the workforce. Only 6 percent of establishments report the use of part-time, temporary, and contract workers as an integral component of their overall business strategy and, interestingly, these establishments employ one in six workers.

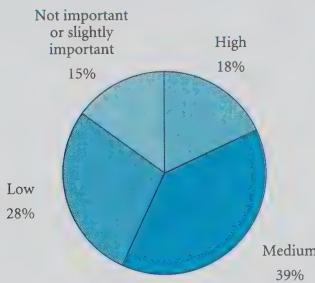
Figure 4.11: Cost-Reduction Strategies Considered Very Important or Crucial



The cost-reduction strategy index¹⁵ reveals that 18 percent of establishments list all cost-saving measures as crucial to their overall business operations. Roughly one of every three establishments in the finance and insurance industry, communications and utilities industry, construction industry, and education and health industry is very concerned with all cost-reduction strategies. About one in six establishments is a non-user of all cost-saving measures outlined in the survey. One-quarter of establishments in the real estate industry are not at all concerned or are only mildly concerned with cost reduction. In terms of size, large establishments (i.e., those that employ 500 workers or more) are about three times more likely than smaller establishments to be concerned with cost-reduction strategies.

Establishments differ in the intensity of their use of cost-reduction strategies.

**Figure 4.12: Cost-Reduction Strategies Index
(percent of establishments)**



¹⁵ The range of scores for the cost-reduction strategy index is as follows:

Not important or slightly important	0-0.5
Low	1
Medium	1.5-2
High	2.5-3

The same qualitative conclusions hold when the score ranges are altered.

**Table 4.7: Intensity of Cost-Reduction Strategy Use**

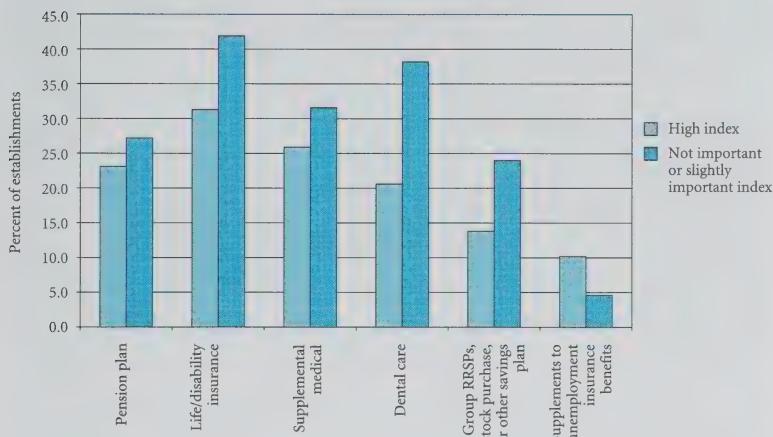
Industry	Percent of establishments in industry whose cost-reduction index is:	
	High	Not important or slightly important
Overall	17.8	15.0
Logging, forestry, mining, quarries, and oil wells	20.8	15.1
Manufacturing: science-based	5.1	20.3
Manufacturing: scale-based	27.6	7.5
Transportation and storage; wholesale trade	6.0	13.0
Retail trade and commercial services	16.4	19.8
Finance and insurance	32.1*	16.0
Real estate operations and insurance agents	2.9	24.2
Business services	4.0	4.6
Construction	29.2	12.6
Communications and other utilities	33.6*	..
Education and health services	29.2	9.9
Manufacturing: product-differentiated	5.3	9.4
Establishment size	Percent of establishments in size group whose cost-reduction index is:	
	High	Not important or slightly important
1-19 employees	18.1	16.5
20-99 employees	13.4	7.0
100-499 employees	18.7	2.2
500+ employees	61.2	1.2

The provision of benefits to permanent full-time employees, with the exception of pension plan coverage, varies across the different cost-reduction index groups.

Establishments that place a great deal of importance on cost-reduction strategies are almost as likely to provide pension plans to their employees as establishments that do not adopt any cost-reduction strategies. Interestingly, establishments that engage in cost-cutting measures are more likely to provide supplements to unemployment insurance benefits. Since one-quarter of cost-conscious establishments use temporary layoffs in response to downturns in their product demand,¹⁶ offering supplements to unemployment insurance benefits may help an establishment maintain its workforce by reducing the job search activity of workers on temporary layoff, while reducing its overall wage bill. Establishments that do not consider cost-saving strategies integral to their overall business strategy tend to provide employees with other benefits such as life/disability insurance, supplemental medical, dental care, group RRSPs, or other savings plans more often than establishments that consider cost-reduction strategies important.

¹⁶ About 8 percent of establishments that do not adopt any cost-cutting strategies underwent temporary layoffs in the past 12 months.

Figure 4.13: Cost-Reduction Index and Provision of Permanent Full-Time Employee Benefits



Establishments that are very concerned with costs are more likely to reduce the number of employees on the payroll through downsizing and delayering practices.¹⁷ These establishments are also more likely to demand a more flexible workforce by encouraging the adoption of functional flexibility practices such as job rotation, multi-skilling, and total quality management, by greater reliance on temporary and part-time workers, and by adopting flexible work hours.

Differences in the way work is organized within an establishment were examined with reference to the importance an establishment gives to cost-reduction strategies.



Table 4.8: Cost-Reduction Strategies and Organizational Change

Organizational change	Percent of establishments in cost-reduction index that have experienced organizational change in past three years	
	High	Not important or slightly important
Downsizing	43.5	14.0
Re-engineering	37.1	11.7*
Increased integration among functional areas	28.6	14.8
Greater reliance on temporary workers	20.5	2.8
Greater reliance on part-time workers	21.0	2.9
Increase in overtime hours	11.5	18.3
Adoption of flexible working hours	40.3	11.2
Delayering	17.9	..
Greater reliance on functional flexibility	42.3	11.8
Increased reliance on external suppliers	21.2	12.1

¹⁷ Delayering refers to reducing the number of managerial levels.

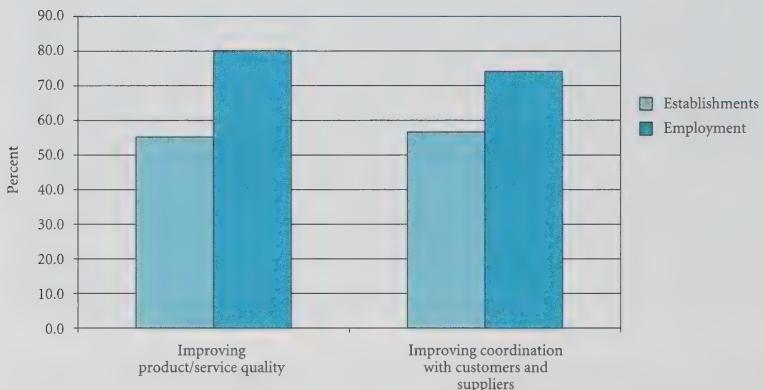
In general, establishments adopting cost-reduction strategies are more likely to

- use temporary layoffs in response to adverse demand shocks
- supplement unemployment insurance benefits
- reduce the number of employees on the payroll through downsizing and delayering
- demand a flexible workforce.

Quality-Related Strategies

Half of all establishments cite improvements to product/service quality and/or improvements in coordination with customers and suppliers as a fundamental component of their overall business strategy. These establishments employ about 75 percent of workers.

Figure 4.14: Quality-Related Strategies Considered Very Important or Crucial



Establishments vary in the intensity of their use of quality-related strategies.

The quality index¹⁸ reveals that two-thirds of establishments cite both improving product/service quality and improving coordination with customers/suppliers as integral components of their overall business strategy. About 90 percent of establishments in the science-based manufacturing, scale-based manufacturing, and communications and utilities industries are very concerned with quality. Roughly half of establishments in the real estate industry and the retail and commercial services industry do not consider the quality-related business strategies outlined in the survey as essential elements of their overall business strategy. There is a positive relationship between the incidence of adoption of quality-related strategies and establishment size; that is, as incidence increases, the number of employees working in the establishment increases.

¹⁸ The range of scores for the quality index is as follows:

Low	0-1
High	1.5-2

The same qualitative conclusions hold when the score ranges are altered.

Table 4.9: Intensity of Quality-Related Strategy Use

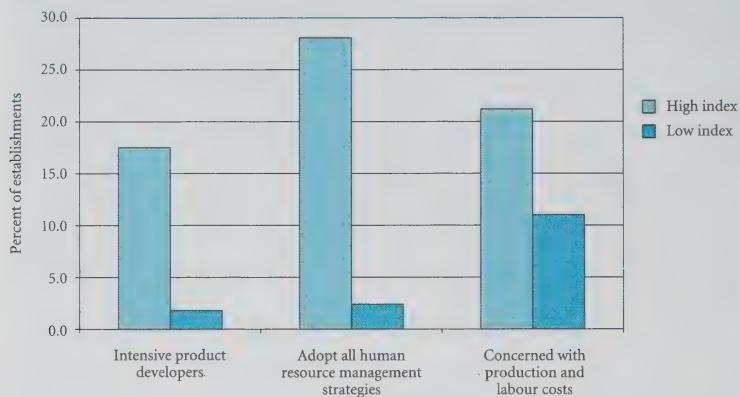
Industry	Percent of establishments in industry and establishment size group whose quality-related strategy index is:	
	High	Low
Overall	67.3	32.7
Logging, forestry, mining, quarries, and oil wells	68.2	31.8
Manufacturing: science-based	89.8	10.2
Manufacturing: scale-based	90.5	9.5
Transportation and storage; wholesale trade	59.1	41.0
Retail trade and commercial services	50.0*	50.0*
Finance and insurance	82.5	17.6
Real estate operations and insurance agents	48.0	52.0
Business services	88.8	11.2
Construction	73.2	26.8
Communications and other utilities	95.3	4.7
Education and health services	68.9	31.1
Manufacturing: product-differentiated	73.7	26.3
Establishment size		
1-19 employees	64.4	35.7
20-99 employees	83.4	16.6
100-499 employees	90.7	9.3
500+ employees	94.4	5.6

Establishments opt for a balanced approach to the adoption of business strategies. Establishments that consider the quality-related strategies crucial to their overall business success are more likely than establishments not concerned with quality issues to engage in all product development strategies, to value human resource management strategies, and to be concerned with cost-reduction. Alternatively stated, establishments that consider quality-related strategies not important are two times more likely not to engage in any product development strategies, are ten times more likely not to value any of the human resource management strategies, and are three times more likely not to be as concerned with costs.

Many establishments strive to incorporate a number of business strategies in their general business plans.



Figure 4.15: Quality Development and Other Business Strategy Groups



In general, establishments that are very concerned with quality-related issues tend to

- be intensive product developers
- adopt all human resource management strategies
- be concerned with cost-reduction strategies.

Competition¹⁹

In addition to the business strategies studied in the previous sections, the decisions of establishments may also depend on the number, the size, and the behaviour of the other establishments in the industry. The globalization and integration of markets has changed the composition of the marketplace. Many believe that establishments are now facing more competitors in their most important markets, and increased foreign competition. The goal of this section is to examine how regional competition, number of competitors, and relative price level relate to both the establishment's characteristics and the outcomes for workers. It is important to keep in mind that the number and size of establishments differ significantly among industries; where applicable, the analysis will focus on particular industries.

¹⁹ This section excludes non-profit organizations and is therefore based on a sample of 611 establishments.

Relative Importance of Regional Competition

Roughly two in three establishments encounter significant local competition in their most important product markets.²⁰ About three-quarters of the establishments in the logging and mining industry, the finance and insurance industry, the business services industry, and the construction industry believe that local establishments offer significant competition to their own establishments. Provincial establishments are significant competitors to about one in four establishments. About two in five establishments in the science-based manufacturing industry, the transportation, wholesale, and storage industry, and the business services industry consider provincial competition significant. Establishments from other parts of Canada are important competitors for about one in eight establishments, and establishments from the United States offer significant competition to roughly one in eleven establishments. Interestingly, about one-third of scale-based manufacturing, product-differentiated manufacturing, and communications and utilities establishments rank competitors from Canada as offering significant competition in their most important product market. For product-differentiated manufacturing establishments, roughly one in two cites American establishments, and one in four lists establishments from other countries (i.e., Mexico, Europe, Pacific Rim) as aggressive competitors.

Examining the establishment size by the region of origin of significant competitors, small establishments (less than 20 employees) are more likely to cite the importance of local establishments than large establishments (500 employees and over). Small establishments are also less likely than large establishments to face significant international competitors.

²⁰ “Significant competition” refers to a situation in which other establishments market similar products to the same customer and establishments in the industry must consider their competitors’ strategies when designing their own. Respondents rank “significant” competitors as very important or crucial.



Table 4.10: Regional Competition by Industry and Establishment size²¹

Industry	Percent of establishments in industry and establishment size group facing significant competition from:				
	Local firms	Provincial firms	Canadian firms	American firms	International firms
Overall	62.9	23.7	13.2	8.9	3.5
Logging, forestry, mining, quarries, and oil wells	75.6	18.1	9.3	8.8	2.7
Manufacturing: science-based	34.6	39.4	32.3	36.2	15.4
Manufacturing: scale-based	49.5	32.2	27.0	34.4	19.4
Transportation and storage; wholesale trade	51.4	41.3	29.4	15.3	5.4
Retail trade and commercial services	67.5*	31.3*	11.1	..	..
Finance and insurance	72.3*	1.4	..	..	..
Real estate operations and insurance agents	53.1	10.0	4.2	2.0	..
Business services	75.3	..	12.3	4.8	8.2
Construction	72.7	15.2	6.2	..	..
Communications and other utilities	32.9*	28.5*	35.9*	20.0*	..
Manufacturing: product-differentiated	38.7	35.5	32.4	53.6	26.7
Establishment size					
1-19 employees	63.6	21.4	10.8	5.4	1.6
20-99 employees	61.9	33.9	25.0	24.8	14.1
100-499 employees	49.8	52.2	37.4	50.3	19.6
500+ employees	47.8	37.5	27.6	36.6	11.8

Number of Competitors in Most Important Product/Service Market

Half of establishments function in very competitive markets in that they face over 20 competitors in their most significant market. Almost three-quarters of the real estate industry competes in such a market. This is not surprising since the industry is characterized by a large number of small establishments catering to a large number of consumers. About 26 percent of all establishments face less than five competitors in their most significant product market. Establishments in the science-based manufacturing industry and in the communications and utilities industry are more likely than other establishments to function in such a market. This is not surprising since these industries are characterized by a relatively few large establishments.

²¹ In the WES, respondents were asked about the importance of competition from each geographical region separately. The respondents were not asked to rank the importance of competition from each region. Therefore, the rows are not supposed to sum to one hundred.

Figure 4.16: Proportion of Establishments by Number of Competitors (percent of establishments)

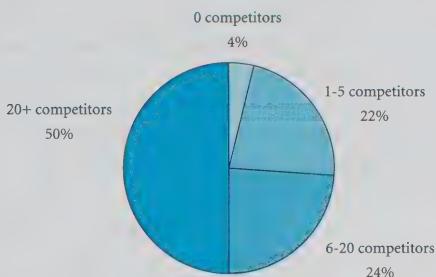


Table 4.11: Number of Competitors



Industry	Percent of establishments in industry and establishment size group facing:	
	0-5 competitors	20+ competitors
Overall	26.0	50.0
Logging, forestry, mining, quarries, and oil wells	23.2	58.2
Manufacturing: science-based	56.2	8.3
Manufacturing: scale-based	29.1	48.5
Transportation and storage; wholesale trade	25.6	53.2
Retail trade and commercial services	19.0	29.7
Finance and insurance	20.3	18.7
Real estate operations and insurance agents	19.4	75.8
Business services	12.2	63.7*
Construction	25.4	56.6
Communications and other utilities	75.4*	20.0*
Manufacturing: product-differentiated	61.8	17.0
Establishment size		
1-19 employees	24.3	52.7
20-99 employees	36.1	35.2
100-499 employees	34.9	25.0
500+ employees	34.7	39.7

Establishments' characteristics vary by the number of competitors in their most important market.

The majority of establishments face more than 20 competitors, offer products similar to those of their competitors, and attempt to satisfy the same needs of the same customers. The number of competitors present in an establishment most important product market may have an impact on the price an establishment charges for its goods or services. About four out of five establishments that compete with more than 20 competitors charge the same price as their competitors. Interestingly, only one in ten establishments facing over 20 competitors charges higher than average prices, compared with one in four establishments in markets with five or fewer competitors. Establishments that face a large number of competitors are also more likely to adopt all business strategies related to cost-reduction. Local establishments offer significant competition both to establishments that face more than 20 competitors and to establishments that compete with less than five establishments. About 72 percent of establishments that face 20 or more competitors cite the importance of local competition, compared with roughly 39 percent of establishments that face less than five competitors. But establishments that face a large number of competitors are more likely to face significant competition in all markets, local or international.



Table 4.12: Number of Competitors and Establishment Characteristics

Establishment characteristics	Percent of establishments facing:	
	0-5 competitors	20+ competitors
Price relative to competitors:		
High	24.0	9.7
Low	15.8	6.5
Same	60.2	83.9
Significant competition from: ²²		
Local firms	39.2	72.1
Provincial firms	11.4	27.5
Canadian firms	4.7	18.4
American firms	8.1	10.1
Other international firms	3.1	4.1
High cost-reduction index	6.5	22.6

²² In the WES, respondents were asked about the importance of competition from each geographical region separately. The respondents were not asked to rank the importance of competition from each region. Thus, the column of numbers on this measure does not sum to one hundred.

Establishments that face more than 20 competitors in their most significant market are less likely to offer their workers pension plans, life insurance, supplemental medical benefits, and group RRSPs or other savings plans. However, workers in establishments with a large number of competitors are more likely to be offered profit-sharing plans and productivity gain-sharing schemes than are workers in establishments that face less than five competitors. Workers in establishments that face more than 20 competitors tend to be younger, with short job tenure and lower levels of education and training. They also tend to be employed in sales and service occupations. Again, one should be cautious in the interpretation of these numbers since these observations may partially result from an establishment size effect, an industry effect, or an occupation effect.²³

The outcomes for workers are associated with the number of competitors faced by establishments in their most important market.



Table 4.13: Number of Competitors and the Outcomes for Workers

Outcomes for workers	Percent of establishments facing:	
	0-5 competitors	20+ competitors
Alternative compensation plans:		
Profit-sharing plans	9.2	14.2
Productivity gain-sharing	2.7	8.0
Provision of benefits:		
Pension plan	28.3	18.2
Life/disability insurance	38.9	33.7
Supplemental medical	34.6	27.8
Dental care	29.9	28.4
Group RRSPs	17.2	12.3
Supplements to UI benefits	13.2	4.5

General Price Level

Roughly three-quarters of establishments charge the same price as their competitors in their most important market. It is not surprising that establishments in the finance and insurance, real estate, and retail and commercial services industries are the most likely to charge prices similar to those of their competitors, since these industries are characterized by a large number of establishments catering to a large number of consumers. Roughly one in six establishments reports charging higher prices. Almost one-third of establishments in the scale-based manufacturing and the communications and utilities industries charge higher than average prices. Only 8 percent of establishments charge lower prices than their competitors. One-fifth of establishments in the logging and mining industry charge lower prices than their competitors in their most significant product market.

²³ For these reasons, it is preferable to perform multivariate analysis in order to control for these effects.



Figure 4.17: General Price Levels Relative to Those of Competitors (percent of establishments)

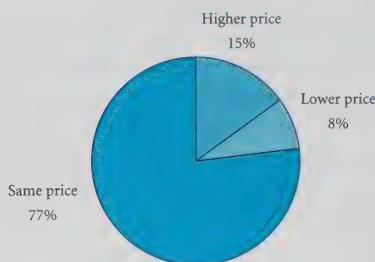


Table 4.14: General Price Level Compared to Competitors by Industry and Establishment Size

Industry	Percent of establishments in industry and establishment size group		
	High	Same	Low
Overall	15.0	76.5	8.5
Logging, forestry, mining, quarries, and oil wells	14.4	63.9	21.7
Manufacturing: science-based	17.9	71.4	10.8
Manufacturing: scale-based	32.3	51.2	16.5
Transportation and storage; wholesale trade	6.5	73.8	19.7
Retail trade and commercial services	11.0	84.3	4.7
Finance and insurance	0.5	82.6	16.9
Real estate operations and insurance agents	2.3	92.3	5.4
Business services	13.4	79.1	7.5
Construction	21.6	75.3	3.1
Communications and other utilities	29.3*	..	18.5*
Manufacturing: product-differentiated	18.6	73.1	8.3
Establishment size			
1-19 employees	14.6	77.3	8.1
20-99 employees	12.5	75.7	11.8
100-499 employees	38.4	54.2	7.5
500+ employees	21.3	77.3	5.3

One in six establishments reports that it charges higher prices than its main competitors in its most important market. Establishments that face foreign competition in their most important product market are more likely to charge higher prices: 28 percent of establishments that face American competition and 37.9 percent of establishments that compete with other countries, such as Mexico, Europe, and Pacific Rim countries, demand higher prices. Interestingly, only one in ten establishments that are very concerned with the actions of local competitors charges higher prices. Establishments that enjoy some degree of market power (as defined by the number of competitors they face in their most important market) are more likely to charge higher prices: almost one in four establishments that compete with less than five other establishments charges higher prices, compared with one in ten establishments that face over 20 competitors. As noted previously, slightly more product developers charge higher prices, presumably to recoup the expenses related to the implementation of these strategies. Finally, large establishments are only slightly more likely to charge higher prices than small establishments.

Establishment characteristics differ by relative price level.

Table 4.15: Establishment Characteristics and Relative Price Levels

	Percent of establishments with characteristic and a relative price that is	
	High	Low
Significant competition from:		
Local firms	10.4	7.9
Provincial firms	23.2	5.8
Canadian firms	17.1	12.9
American firms	27.8	4.9
Other international firms	37.9*	8.6
Product development index is high	16.5	10.4
Number of competitors:		
0-5	24.0	15.8
20+	9.7	6.5

Table 4.16 shows that workers in establishments that charge higher market prices are more likely to be offered alternative compensation schemes such as profit-sharing plans, productivity gain-sharing, employee stock purchase plans, and individual incentive systems than are workers in establishments that charge the same price as their competitors. Establishments that charge higher prices are also more likely to provide pension plans, life insurance, and group RRSPs or other savings plans than are establishments that charge the same price. There is very little difference in the provision of medical benefits, dental care, and supplements to unemployment insurance.



Establishments that charge higher than average prices for their goods/services are more likely to provide incidental benefits to their workers.



Table 4.16: Establishments' Comparative Price and the Outcomes for Workers

Outcomes for workers	Percent of establishments in relative price group offering these compensation schemes and benefits	
	High price	Same price
Alternative compensation plans:		
Profit-sharing plans	17.9	12.5
Productivity gain-sharing	17.6	6.7
Employee stock purchase plan	4.7	2.1
Individual incentive systems	30.4	21.1
Provision of benefits:		
Pension plan	30.3	17.2
Life/disability insurance	41.6	36.6
Supplemental medical	32.6	30.4
Dental care	28.3	30.1
Group RRSPs	20.2	11.9
Supplements to UI benefits	6.6	9.5

In general, most establishments

- find competition from local establishments to be significant
- face more than 20 competitors in their most significant market. Those that do
 - charge the same price as their competitors
 - tend to be intensive users of cost-reduction strategies
 - cite establishments from a variety of regions as providing significant competition

In general,

- workers in establishments that charge higher prices compared to those in establishments that charge the same price
 - are more likely to receive a pension plan, life/disability insurance, and group RRSPs
 - are more likely to be offered alternative pension plans
- establishments that compete with more than 20 other establishments
 - are less likely to offer various benefits to permanent, full-time workers
 - are more likely to offer alternative compensation schemes

Summary

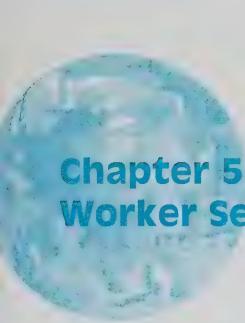
The dynamic nature of business and its interaction with the Canadian labour market is the focal point of this chapter, which provides basic information on business strategies, the types of establishments that employ them, and the experiences of workers in such establishments.

This chapter uses univariate and bivariate analytical techniques. However, the variable in question is often related to the values taken by several other variables. For example, differences in establishment size may explain a significant portion of what we observed in the chapter. The goal of the chapter was not to measure the statistical dependence among variables, nor to show what causes these outcomes; rather, our goal was to show the wealth of information collected by the WES and to present some interesting and useful correlations between variables.

Our results may be summarized as follows:

- Compared with establishments that do not adopt any product development strategies, product developers are concerned about human resource strategies, have a broad sales market base and are more likely to participate in government-sponsored programs. These establishments are more likely to employ alternative compensation schemes, to have hired new employees in the past 12 months, to be currently engaged in the recruitment process, and to have unfilled vacancies. Workers in these establishments tend to be more successful: they tend to be more skilled, to have more education, to have received training more often, to be promoted more often, and to earn more than workers in establishments that do not participate in product development business strategies.
- In general, establishments that value human resource management strategies tend to employ progressive work organization practices, offer formal vocational training, provide formal/informal grievance procedures, bestow more generous non-wage benefits, adopt alternative work arrangements, and undertake formal performance appraisals. Workers in these establishments tend to be unionized, are more likely to be promoted, and tend to participate in progressive work organization practices.
- In general, establishments adopting all cost-reduction strategies are more likely to face more than 20 competitors. These establishments are also more likely to use such organizational changes as downsizing and delayering to reduce the number of employees on their payroll. Interestingly, these establishments use temporary layoffs in response to downturns in their product demand while at the same time offering supplements to unemployment insurance. Establishments that are cost-conscious are more likely to demand a more flexible workforce by encouraging functional flexibility through job rotation, multi-skilling, and total quality management, and by offering flexible work hours.

- Establishments that are very concerned with quality-related business strategies tend to be intensive product developers; they tend to adopt all human resource management strategies; and they are concerned with overall cost reduction.
- In addition to the business strategies, the decisions of establishments depend on the number, the size, and the behaviour of the other establishments in the industry. The majority of establishments face more than 20 competitors in their most important market. Establishments in this market also face more aggressive competition from the United States, Mexico, the Pacific Rim, Europe, and other countries. As for the outcomes for Canadian workers employed in establishments that face more than 20 competitors in their most significant market, they are less likely to receive fringe benefits, but are more likely to be offered profit-sharing and productivity gain-sharing plans.
- The majority of establishments charge the same price for their goods and services as their competitors. Establishments that charge higher than average prices are more likely to face foreign competition. Establishments that enjoy some degree of market power are also more likely to charge higher prices. Workers in establishments that charge higher than average prices for their goods/services are more likely to receive incidental benefits, such as alternative compensation schemes and pension plans.



Chapter 5 — Hiring, Job Vacancies, and Worker Separations

Alain Baril

This chapter deals with hiring and separation trends in establishments and with the relationships between the characteristics of new employees and those of their employers. The pilot “Workplace and Employee Survey” (WES) contains information that makes it possible to identify establishments that hired new staff in the previous 12 months, which for most establishments means primarily during 1995. In the period of economic recovery following the recession of the early part of the decade, 1995 marks a pause in employment growth, contrasting with both the preceding and the following years, which are characterized by an increase in employment. This chapter examines the characteristics of establishments that hired staff in 1995, and also looks at their hiring, termination, and training practices.

The survey also allows us to distinguish between employees according to hiring date. Two categories of employees are established: new employees, who were hired in January 1995 or later, and longer-service employees, hired before January 1995. These two groups will be compared to determine whether the employment conditions of new employees differed from those of employees with more service. Because of the unique nature of the survey, which allows us to correlate information on establishments with data concerning their employees, we can compare the characteristics and practices of the respective employers.

Hiring Practices

More than half of the establishments surveyed had hired workers in the last 12 months. This does not, however, mean that the number of employees increased accordingly over the same 12-month period. Part of the total number of hires in 1995 represents a net increase in worker employment, while another part constitutes employee turnover due to seasonal or other factors. Of the individuals hired in 1995, some were no longer working at the same establishment because they resigned, were dismissed, or retired.

Establishment size has a direct impact on hiring practices. The larger the establishment, the greater the likelihood that it hired new workers in 1995. Nonetheless, all establishments, large or small, that hired even one employee are counted as having done hiring. The picture changes if we consider the proportion of persons hired or the absolute number of persons hired. The proportion and number of persons hired

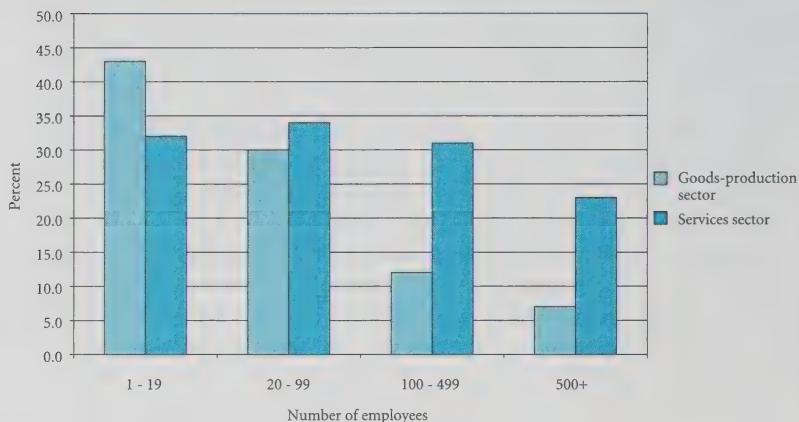
Most establishments hired employees in 1995.

In 1995, small establishments hired the most employees.

in 1995 tended to decrease as establishment size increased. This situation may be due partly to a higher turnover of employees in small establishments, since some of the employees hired in the 12 months preceding the survey had already left by the survey date.



Figure 5.1: Hiring Rate[†] in Last 12 Months, by Establishment Size



[†] Number of persons hired as percentage of total number of employees

Almost nine out of ten establishments in the science-based manufacturing sector did hiring in 1995, as did eight out of ten in the product-differentiated manufacturing, and education and health services sectors. At the other end of the scale, because of unfavorable economic conditions, only one establishment in four in the real estate operations and insurance agents sector did any hiring in the 12 months preceding the survey. Generally speaking, there is no difference in behaviour between establishments in the services sector and those in the goods-production sector as far as hiring practices are concerned (57 percent of services establishments hired staff in 1995, compared with 55 percent of goods-producing establishments). While the high hiring rate in the construction sector is probably connected with the nature of employment in this industry, the high hiring rate in the retail trade sector is partly attributable to the high turnover associated with lower-paying jobs. Conversely, the very low hiring rate seen in the education and health services sector reflects not only the very weak employment growth in this sector but also a much lower than average layoff and quit rate.

Table 5.1: Hiring by Industry

Industries	Percent of establishments that did hiring	Hiring rate
Logging, forestry, mining, quarries, and oil wells	65	26
Manufacturing: science-based	86	13
Manufacturing: scale-based	70	10
Transportation and storage; wholesale trade	74	31
Retail trade and commercial services	74	38
Finance and insurance	44*	7
Real estate operations and insurance agents	26	14
Business services	45*	19
Construction	47	..
Communications and other utilities	60	3
Education and health services	79	2
Manufacturing: product-differentiated	81	12

The results of the pilot survey show that one-third of workers hired by the surveyed establishments in the last 12 months were unskilled production workers, although they represented only one-quarter of the workforce. This does not necessarily reflect a strong demand for this category of workers; instead, it may indicate a higher turnover rate. At the opposite end of the spectrum, while one worker in five was a manager or a professional, these categories accounted for only one new hire in ten. For workers in the sales and technical categories, hiring rates matched the workforce participation rates.



Unskilled employees are over-represented among staff hired in 1995.

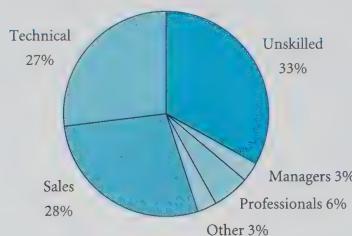
Table 5.2: Hiring Rate by Occupation Group

	Percent of employees	Hiring rate
Managers	10.5	3.3
Professionals	10.2	6.1
Sales	25.3	28.0
Technical	23.9	26.9
Unskilled	25.6	32.6
Other	4.5	3.2





Figure 5.2: Percent of Employees Hired in the Last 12 Months, by Category of Employee



The proportion of unskilled personnel hired was highest in the logging, forestry, mining, quarries, and oil wells sector, and the manufacturing sectors. On the other hand, more than six out of ten workers hired in the communications and other utilities sector were managers or professionals. Establishments in the construction and logging, forestry, mining, quarries, and oil wells sectors employed proportionally few managerial or professional workers.



Table 5.3: Percent of Employees Hired, by Industry, for Selected Occupations

Industries	Unskilled employees	Managerial or professional employees
Logging, forestry, mining, quarries, and oil wells	74.0	3.4
Manufacturing: science-based	41.3	26.3
Manufacturing: scale-based	72.0	7.1
Transportation and storage; wholesale trade	35.9	5.6
Retail trade and commercial services	13.6	4.6
Finance and insurance	2.4	26.5
Real estate operations and insurance agents	15.8	10.1
Business services	31.7*	38.4*
Construction	26.6	0.9
Communications and other utilities	15.2	64.0*
Education and health services	15.7	35.3
Manufacturing: product-differentiated	51.2	8.5

Two-thirds of managers and professionals were hired in the services sector. Conversely, twice as many unskilled workers were found in the goods-producing sector as in the services sector. Generally speaking, there was a lower turnover in big establishments, where larger numbers of more highly-skilled staff were hired.

Table 5.4: Percent of Employees Hired, by Establishment Size and Occupation Group

	Number of employees				
	1-19	20-99	100-499	500+	Total
Managers	37.8	21.1	24.5	16.6	100
Professionals	7.4	27.8	15.6	49.2	100
Sales	21.7	9.9	18.5	..	100
Technical	27.8	55.6*	10.4	6.2	100
Unskilled	39.3	30.7	22.0	8.0	100
Other	66.3*	6.3	15.2	12.2	100

Despite a relatively high unemployment rate in Canada at the time of the pilot survey, one establishment in five was actively recruiting new employees. More than one-third of establishments in the business services, differentiated-product manufacturing, and education and health services sectors was actively looking for new employees. However, this demand for workers is not necessarily aimed at increasing the net number of employees; it may also reflect the need to replace people who have left. Despite active recruitment to fill vacant positions, nearly one business in ten had some unfilled positions. These vacancies were equivalent to 1 percent of the workforce at the time of the survey. Three vacant positions in ten had been unfilled for four months or more, a relatively modest figure.



Unfilled vacancies

represented only 1% of the workforce at the time of the survey.

Figure 5.3: Establishments Actively Recruiting New Employees by Industry

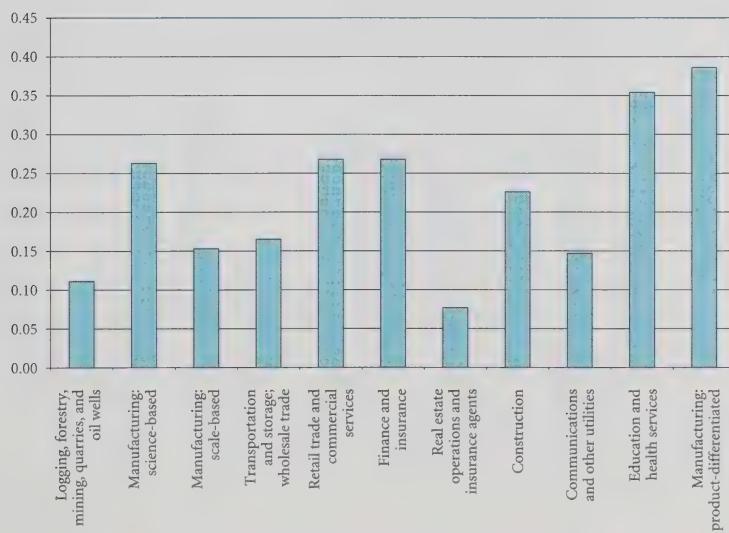




Figure 5.4: Establishments with Job Vacancies by Industry

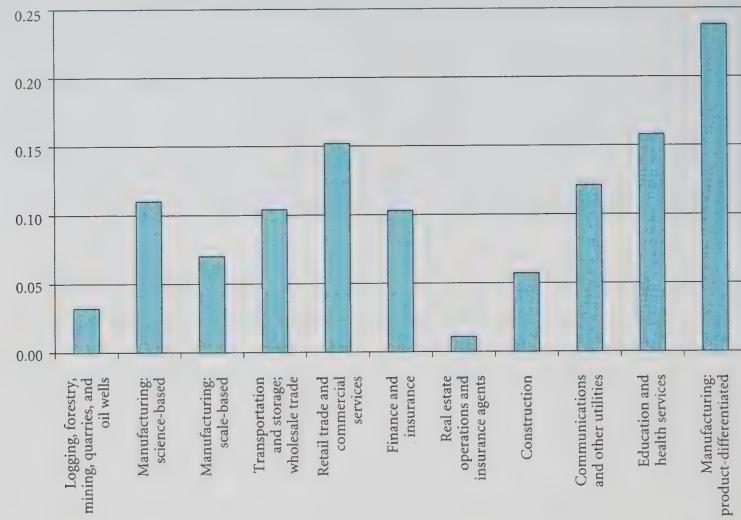
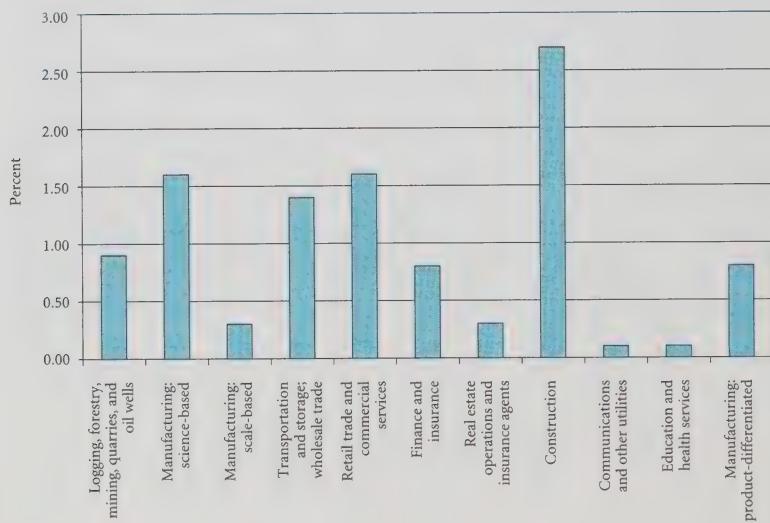
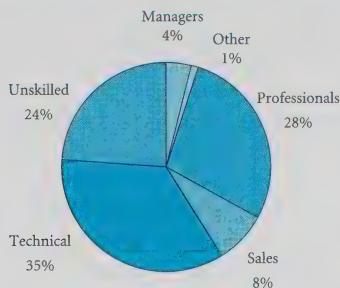


Figure 5.5: Job Vacancies as Percent of Total Number of Employees, by Industry



Although the professional category represented only 10 percent of the workforce, 28 percent of all job vacancies fell into this category. Thirty-five percent of vacant positions were for technical personnel, and 24 percent for unskilled workers.

Figure 5.6: Percent of Job Vacancies Despite Active Recruitment, by Category of Employee

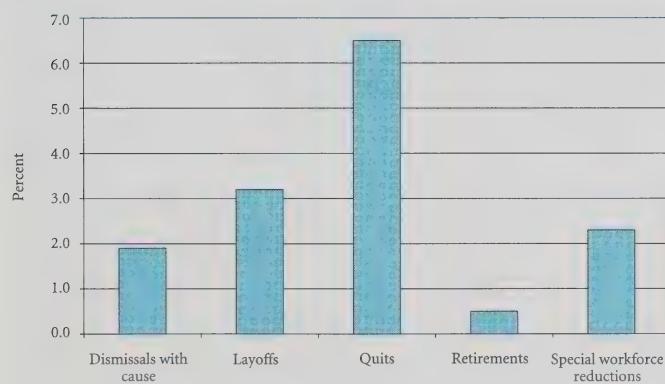


In 1995, the total number of separations represented 14.3 percent of the workforce. Employer-initiated separations were the most numerous. Layoffs, special workforce reductions and dismissals for cause were equal to 7.4 percent of the total number of individuals employed at the time by these establishments. Voluntary separations were almost as numerous. Quits represented 6.5 percent of the workforce in 1995. More than half of all the employees who resigned were in the sales category. Retirements accounted for only a very small proportion of separations. Managers and professionals enjoyed greater employment stability, and there were fewer separations in these two categories, whether employee- or employer-initiated.



In 1995, the total number of separations amounted to 14 percent of the workforce.

Figure 5.7: Permanent Separation[†] Rate, by Cause



[†] Permanent separations as percent of total employment.

Establishments that adopted new technologies, or that introduced new products or processes, did less hiring than other establishments but retained their employees longer.



The WES makes it possible to identify establishments that adopted a new technology, created new products, or launched new services. Whether or not an establishment innovates may have an effect on employee hiring or separation practices. The following table shows hiring, quit, and layoff rates depending on whether or not the establishments concerned had installed new software, implemented computer-controlled or computer-assisted technology, or created new products, processes, or services in the last three years. Establishments that introduced such changes are regarded as having modified their technology or innovated. We find that hiring rates and quit rates are both systematically lower in these establishments, which hire less often but retain their employees longer. On the other hand, this observation may be related to establishment size. Large establishments adopt new technologies more often than small ones do.

Table 5.5: Hiring, Quit, and Layoff Rates Depending on Whether or Not Establishments Adopted New Technologies or Innovated

Establishments that installed new software		
	No	Yes
Hiring rate	19.3	13.0
Quit rate	9.0	3.4
Layoff rate	2.3	2.9
Establishments that implemented technology		
	No	Yes
Hiring rate	18.8	12.6
Quit rate	7.1	4.3
Layoff rate	3.3	2.9
Establishments that created new products or launched new services		
	No	Yes
Hiring rate	21.9	12.4
Quit rate	8.7	4.0
Layoff rate	3.7	2.6

How Do the Working Conditions of New Employees Compare with Those of Employees with Longer Service?

There is a growing gap in working conditions between people who have recently entered the labour market and those who have been working for a long time, in particular with regard to income and employment stability. This part of the chapter compares some characteristics of new employees with those of employees who have been on the job longer.

The breakdown of new hires by industry is consistent with the hiring rates reported at the beginning of this chapter. According to the results of the employee survey, 10.6 percent of workers had been hired since January 1995, that is, during the year preceding the interviews. This proportion varies considerably, depending on industry and establishment size. At the time of the survey, for example, one employee in four in the transportation, storage, and wholesale trade sector, and one in five in the business services sector, had been hired within the last year. In contrast, the education and health services sector and the communications and other utilities sector had virtually no new employees. It is interesting to note that the proportion of new employees decreases as establishment size increases. New employees made up 17.1 percent of the workforce in small establishments, defined as those having 1 to 19 employees. This proportion declines as establishment size increases, and amounts to 3.6 percent among establishments with 500 or more employees. These data suggest that there is greater employment stability in very large establishments. Those employed by large establishments have tended to be on the job longer than those who worked for small establishments, in part because of higher staff turnover in small establishments.

The largest proportion of new hires is found in the transportation, storage, and wholesale trade sector and in small establishments.

Table 5.6: New Hires by Industry

Industry	Percent of new workers
Logging, forestry, mining, quarries, and oil wells	17.4
Manufacturing: scale-based	3.8
Manufacturing: product-differentiated	17.8
Manufacturing: science-based	8.1
Construction	18.9
Transportation and storage; wholesale trade	25.6
Communications and other utilities	2.1
Retail trade and commercial services	13.8
Finance and insurance	9.4
Real estate operations and insurance agents	10.7
Business services	20.9
Education and health services	2.1
Total	10.6



Table 5.7: New Hires by Establishment Size

Establishment size	Percent of new employees [†]
1-19	17.1
20-99	16.7
100-499	15.5
500+	3.6

[†] These data on the number of new employees differ from those on the number of persons hired in the last 12 months because they represent two different realities. The data on new employees include only employees hired in the year preceding the survey and who were still working for the establishment. The number of employees hired in the last 12 months, as established from information supplied by the employers, also includes individuals who were no longer employed by the establishment because they were dismissed, retired, found employment elsewhere, or left for other reasons.

Employees with little formal education were over-represented among new hires since they were concentrated in jobs with high turnover rates or in small establishments.

We find that the level of formal education of new employees was different from that of employees who had been on the job longer. Among new hires, 19.4 percent did not have a secondary school diploma. This proportion is much higher than that among employees with more service, where the figure was only 9.0 percent. Persons with a low level of formal education were hired primarily by small establishments. In contrast, the majority (68.5 percent) of new hires in establishments with 500 employees or more had a university education. These facts support the hypothesis that the larger proportion of employees without a secondary school diploma among new employees and in small establishments reflects a tendency for individuals with little formal education to change jobs more often.

There were proportionally fewer union members among new hires.

The data from the WES show that just over 10 percent of new hires were union members. On the other hand, a much higher proportion of longer-term employees belonged to a union (35.6 percent). As might be expected, large establishments had the highest proportion of unionized employees. Regardless of establishment size, however, the proportion of union members was always lower among new employees than among staff with more service. This phenomenon may be due to greater mobility among non-unionized employees, who may change jobs more frequently. It might also reflect a greater desire on the part of employers to hire non-unionized staff in order to have more flexibility in managing their employees.

Table 5.8: Percent of Union Members

Establishment size	New employees	Longer-service employees
1-19 employees	1.4	7.8
20-99 employees	5.7	14.7
100-499 employees	23.1	32.5
500+ employees	23.6	52.6

An establishment may decide to proceed with hiring because of increased complexity in the technology it employs. Large establishments may thus have hired experienced or more qualified workers, who receive higher salaries, in order to make use of a new technology. We already know that the level of formal education among newly hired staff is higher in large establishments than in small ones. However, the data from the survey show that only three new employees in ten worked in an establishment where the complexity of the technology increased, while the proportion is twice as high for staff with longer service (i.e., six in ten). This trend is found to varying degrees in all establishments, regardless of size.

Those who have recently joined an establishment often require training to help them do their jobs better. Among new employees, nearly three in ten had received structured training related to their job in the 12 months preceding the survey. This is, however, lower than the proportion for staff with more service, of whom four in ten had received such training. Generally speaking, the probability of having received training increased with establishment size.

Summary

Using the results of the pilot Workplace and Employee Survey, this chapter has attempted to describe hiring and separation trends in establishments, and the characteristics of new employees and their employers. The unique nature of this survey allowed us to correlate information obtained from employees with the data collected through the questionnaire for establishments. The following paragraphs summarize our findings.

The probability that a business hired in 1995 and the number of persons hired vary considerably according to industry and establishment size. The proportion and number of individuals hired in the 12 months preceding the survey tends to decrease as establishment size increases. It should be noted that part of the total number of hires in 1995 represented a net increase in employed workers, while another part represents staff turnover due to seasonal factors or other factors such as dismissals or retirements. Consequently, while small establishments hired more often than large ones, this was in part due to their higher staff turnover.

One-third of the employees hired by the surveyed establishments in 1995 were unskilled workers, although this category represented only one-quarter of the overall workforce. Moreover, one worker in ten hired in 1995 was a manager or a professional,

while these two categories represented one-fifth of the workforce. Unskilled workers were hired more in the logging, forestry, mining, quarries, and oil wells sector and the manufacturing sectors, while most managers and professionals were hired in the services sector.

Despite active recruitment to fill vacant positions, nearly one establishment in ten had some unfilled positions. These vacant positions were equivalent to only 1 percent of the workforce at the time of the survey. Three job vacancies in ten had been unfilled for four months or more. Although the professional category represented only 10 percent of the workforce, 28 percent of all vacant positions were in this category.

Layoffs, workforce reductions, and dismissals for cause were equivalent to 7.4 percent of the workforce, while quits represented 6.5 percent. On a proportional basis, managers and professionals enjoyed greater employment stability; there were fewer separations in those categories, whether they be employee- or employer-initiated.

Establishments that adopted new technologies or introduced new products or processes did less hiring than others but retained their employees longer. Hiring and separation rates were systematically lower in establishments which, in the last three years, installed new software, implemented computer-controlled or computer-assisted technology, or created new products, processes, or services. This indicates more employment stability in these establishments, but may also be due in part to the effect of establishment size.

Although large establishments are more likely to be unionized, there were proportionally fewer union members among new employees, regardless of establishment size. This may be due to the fact that non-unionized employees have greater mobility, or, in other words, change jobs more frequently.

Appendix A — Concepts and Methods

Objectives

The Workplace and Employee Survey (WES) is designed to explore a broad range of issues relating to employers and their employees. The survey aims to shed light on the relationships among competitiveness, innovation, technology use, and human resource management on the employer side, and technology use, training, job stability and earnings on the employee side.

The survey is unique in that employers and employees are linked at the microdata level: employees are selected from within sampled workplaces. Thus, information from both the supply and demand side of the labour market is available to enrich studies on either side of the market.

Target Population

The target population for the employer component is defined as all establishments operating in Canada which have paid employees, with the following exceptions:

- a) employers in Yukon and the Northwest Territories;
- b) employers operating in agriculture and related services; fishing and trapping; highway, street, and bridge maintenance; federal government services; provincial and local government services; international and other extra-territorial government services; private households; and religious organizations.

The target population for the employee component is all employees working in the selected workplaces who receive a Revenue Canada T-4 Supplementary form. If a person receives a T-4 slip from two different workplaces, the person will be counted as two employees on the WES frame.

Survey Population

The survey population is the collection of all units for which the survey can realistically provide information. The survey population may differ from the target population due to operational difficulties in identifying all the units that belong to the target population.

The WES draws its sample from the Business Register (BR) maintained by the Business Register Division of Statistics Canada and from lists of employees provided by the surveyed employers.

The Business Register is a list of all businesses in Canada and is updated each month using data from various surveys, business profiling, and administrative data.

Reference Period

The reference period for the pilot WES was mainly the 12-month period ending April 1996. Some of the questions in the workplace portion covered the last three years ending April 1996.

Sample Design

A survey frame is a list of all units that carries the contact information and classification (e.g., industrial classification) information on the units. This list is used for sample design and selection; ultimately, it provides the contact information for the selected units.

(i) Workplace Survey

The survey frame for the workplace portion was created from the information available on the Statistics Canada Business Register, which is a database containing information (e.g., contact, classification) on all businesses operating in Canada. The WES used the entire register with the exceptions described in the definition of the target population above.

Before sample selection, the establishments on the WES frame were stratified into relatively homogeneous groups. These groups are called strata and are used for sample allocation and selection. The establishments were first stratified according to their industry (14) and region (6). Within each industry region combination, several size strata were created. The establishment size was measured by estimated employment from the Business Register Division.

Initially, proportional allocation was used for the regions and square root allocation for the industries. In order to allocate a sample of size n to the stratum level, a sample of size n was first allocated across the 14 industries at the Canada level using square root allocation. In addition, a sample of size n was allocated across the six regions at the all-industry level using proportional allocation. To ensure that the sample allocated to each industry/region cell added up to the marginal totals, an iterative raking procedure was used. At each step, the calculated industry/region sample sizes were checked, and adjusted if necessary, to ensure that at least four establishments had been allocated to each group, and that no group had been allocated a sample that was greater than the number of establishments in the population.

Once the sample sizes for each industry/region cell had been calculated, the number of size strata within each group was determined. The number of size strata can vary from one industry/region group to another according to the sample allocated to the group; the number of size strata is kept reasonably small. The cut-off points between size strata within a group were determined using Sethi's algorithm for Neyman allocation.

This process generated between one and nine size classes within each industry/region combination, resulting in 257 strata for the overall sample of 5,500 workplaces.

From the planned production design of 257 strata, 73 strata with a total of 1,311 workplaces were selected for the purposes of the large-scale pilot survey. The selection was not random. The 73 strata were selected in order to construct complete industry/region combinations permitting an assessment of the analytical capabilities of the survey design and the data collected within the design.

Some sampled establishments were responsible for several workplaces. In this case the workplaces were stratified by type of activity (e.g., head office, typical location, etc.) and sub-sampled at the rate of one workplace per workplace stratum. Head office workplaces were selected with certainty.

All sampled units were assigned a sampling weight (a raising factor attached to each sampled unit to obtain estimates for the population from a sample). For example, if two units were selected at random and with equal probability out of a population of ten units, then each selected unit would represent five units in the population, and it would have a sampling weight of five.

The pilot WES collected data from 748 out of the 1,311 sampled employers. The remaining employers were a combination of workplaces determined to be either out-of-business, seasonally inactive, holding companies, or out-of-scope. The majority of nonrespondents were owner-operators with no paid help and in possession of a payroll deduction account.

(ii) Employee Survey

The WES employee survey frame was based on lists of employees made available to interviewers by the selected workplaces. A maximum of seven employees was sampled using a probability mechanism. In workplaces with fewer than seven employees, all employees were selected.

A total of 3,468 possible employees were selected from the surveyed workplaces. Sixty-seven percent (2,331) of the 3,468 sampled employees agreed to participate in the survey, and 1,960 actually provided responses. Of the 371 employees who did not provide responses, 285 were late refusals, and 86 could not be contacted within the pilot survey collection window. The 1,960 employees represented 544 workplaces.

Data Collection

Data collection, data capture, preliminary editing, and follow-up of non-respondents were all done in Statistics Canada Regional Offices. The workplace survey data were collected by interviewers in person. The workplace questionnaire covered a wide range of topics. For about 20 percent of the surveyed units (mostly large workplaces), more than one respondent was required to complete the questionnaire. For the employee component, telephone interviews were used for persons who had agreed to participate in the survey by filling out and mailing in a consent form.

Statistical Edit and Imputation

Once complete data were available, they were analyzed extensively. Extreme values were listed for manual inspection in order of priority decided by the size of the deviation from average behaviour and the size of their contribution to the overall estimate.

For respondents who did not complete the questionnaire, an estimate was imputed for all missing numeric and character fields with the exception of switches indicating skip patterns. To impute missing values, a technique called nearest neighbour imputation was used for both employers and employees. The method is based on first creating a pool of possible donors that are close to the record being imputed for a number of key matching variables. From the donor pool, a unit is selected at random to impute the record with the missing values.

The WES components were treated independently even if some of the questions on the employee questionnaire could have been imputed from the related workplace questionnaire. Total refusals and those respondents who could not be contacted within the collection window were not imputed for the pilot WES.

Estimation

The reported (or imputed) values for each workplace and employee in the sample were multiplied by the weight for that workplace or employee; these weighted values were summed to produce estimates. An initial weight equal to the inverse of the original probability of selection was assigned to each entity. To calculate variance estimates, the initial survey weights were adjusted to force the estimated totals in each industry/region group to agree with the known population totals. These adjusted weights were then used to form estimates of means or totals of variables collected by the survey.

Variables for which population totals are known are called auxiliary variables. They are used to calibrate survey estimates to increase their precision. The auxiliary variable used for the WES was total employment obtained from the Business Register. Calibration was carried out in two steps. First, each workplace was adjusted to total employment for the corresponding establishment, and then each establishment was calibrated to known population totals at the industry/region level.

Estimates are computed for many domains of interest such as industry and region.

Data Quality

Any survey is subject to errors. While considerable effort is made to ensure a high standard throughout all survey operations, the resulting estimates are inevitably subject to a certain degree of error. Errors can arise due to the use of a sample instead of a complete census, from mistakes made by respondents or interviewers during the collection of data, from errors made in keying the data, from imputation of a consistent but not necessarily correct value, or from other sources.

Sampling Errors

The true sampling error is unknown, however, it can be estimated from the sample itself by using a statistical measure called the standard error. When the standard error is expressed as a percent of the estimate, it is known as the relative standard error or coefficient of variation.

Non-Sampling Errors

The sampling error is only one component of the total survey error. All other errors arising from all phases of a survey are called non-sampling errors. For example, these types of errors can arise when a respondent provides incorrect information or does not answer certain questions; when a unit in the target population is omitted or covered more than once; when a unit that is out of scope for the survey is included by mistake; or when errors occur in data processing, such as coding or capture errors. While the impact of the non-sampling error is difficult to evaluate, certain measures such as response and imputation rates can be used as indicators of the potential level of non-sampling errors.

Some non-sampling errors will cancel out over many observations, but systematically occurring errors (i.e., those that do not tend to cancel) will contribute to a bias in the estimates. For example, if respondents consistently tend to under-estimate their sales, then the resulting estimate of the total sales will be below the true population total. Such a bias is not reflected in the estimates of standard error. As the sample size increases, the sampling error decreases. However, this is not necessarily true for the non-sampling error.

Coverage Errors

Coverage errors arise when the survey frame does not adequately cover the target population. As a result, certain units belonging to the target population are either excluded (under-coverage), or counted more than once (over-coverage). In addition, out-of-scope units may be present in the survey frame (over-coverage).

Response Errors

Response errors occur when a respondent provides incorrect information due to misinterpretation of the survey questions or lack of correct information, gives wrong information by mistake, or is reluctant to disclose the correct information. Gross response errors are likely to be caught during editing, but others may simply go through undetected.

Non-Response Errors

Non-response errors can occur when a respondent does not respond at all (total non-response) or responds only to some questions (partial non-response). These errors can have a serious effect if non-respondents are systematically different from respondents in survey characteristics and/or the non-response rate is high.

Processing Errors

Errors that occur during the processing of the data are another component of the non-sampling error. Processing errors can arise in data capture, coding, editing, imputation, outlier treatment, and other types of data handling. A coding error occurs when a field is coded erroneously because of misinterpretation of coding procedures or bad judgement. A data capture error occurs when data are misinterpreted or keyed incorrectly.

Joint Interpretation of Measures of Error

The measure of non-response error and the coefficient of variation must be considered jointly to have an overview of the quality of the estimates. The lower the coefficient of variation and the higher the response fraction, the better will be the published estimate.

Several key variables have been identified in both the workplace and employee portions of the survey to provide examples of data quality in terms of coefficient of variation. From the workplace survey, the variables for gross payrolls, gross operating revenue and expenditure, the number of persons using computers, and non-wage expenditures have been selected. On the employee survey side, the variables for usual hours of work, time spent on computers, participation in training, and the hourly wage rate have been chosen.

At the industry level, the coefficients of variation ranged from 0.023 to 0.158 for gross payrolls; 0.124 to 0.642 for gross operating revenue; 0.118 to 0.422 for gross operating expenditures; 0.084 to 0.526 for the number of persons using computers; and 0.110 to 0.428 for non-wage expenditures. On the employee side, the coefficients of variation ranged from 0.016 to 0.104 for usual hours of work; 0.068 to 0.691 for time spent on computers; 0.076 to 0.253 for participation in training; and 0.020 to 0.129 for the hourly wage rate.

The precision of estimates has been affected by non-responding and out-of-scope units. These non-sampling errors are being addressed for the production survey scheduled to be in the field in April 1999. This, combined with a larger sample size will alleviate the problem of lack of precision in many estimation cells. Another contributing factor to increased variability for some variables is the presence of legitimate zero responses. This often inflates the squared deviations from the mean used in the computation of variance.

Confidentiality

The information presented in this publication has been reviewed to ensure that the confidentiality of individual responses is respected. Any aggregated estimate that could reveal information about a specific respondent is declared confidential, and consequently not published.

Response/Non-Response

- a) Response rate: includes all units which, during the collection phase, responded by providing “usable information”.
- b) Refusal rate: includes those units which were contacted but have refused to participate in the survey.
- c) No contact rate: includes those units which were contacted but were unable to provide the required information.
- d) Residual non-response rate: includes those units for which the data was not received in time for the collection window period, and other types of non-response such as unable to contact.

Industry Classification

On the basis of its principal activity, each establishment is assigned an industry code according to the 1980 Standard Industrial Classification. A description of the various industries and groups of industries is contained in the “Standard Industrial Classification Manual” Catalogue 12-501.

For analytical purposes, we have created industry groupings that in all cases, except for manufacturing, conform to the 1980 Standard Industrial Classification. See Appendix B for the three- and four-digit SICs that correspond to the analytical groups.

Geographic Classification

Reporting units are assigned to a province or region. The pilot WES statistics are based on the 1986 version of the Standard Geographic Classification. Appendix C defines the geographic region classifications used in the pilot Workplace and Employee Survey.

Appendix B — Industry Definitions

WES industry code	Industry description	3- or 4-digit 1980 Standard Industrial Classification (SIC80) codes
01	Logging, forestry, mining, quarries, and oil wells	SIC3 in (040 - 051; 060 - 092)
02	Manufacturing: natural resources	SIC3 in (101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 112, 113, 114, 121, 122, 161, 162, 163, 169, 252, 254, 258, 279, 283, 295, 296, 297, 352, 354, 355, 358, 359, 361, 369, 397) or SIC4 in (1711, 1992, 2511, 2592, 2593, 2599, 2692, 2699, 3511)
03	Manufacturing: labour intensive	SIC3 in (181, 182, 183, 191, 192, 193, 231, 243, 244, 245, 249, 256, 261, 264, 301, 302, 303, 304, 309, 392, 399) or SIC4 in (1712, 1713, 1719, 1991, 1993, 1994, 1995, 1999, 2591, 2691, 3257, 3281, 3332, 3333)
04	Manufacturing: scale-based	SIC3 in (151, 152, 159, 271, 272, 273, 281, 282, 284, 291, 292, 294, 299, 305, 356, 357, 371, 372, 373) or SIC4 in (2512, 3231, 3241, 3242, 3251, 3252, 3253, 3254, 3255, 3256, 3259, 3261, 3271, 3299, 3512, 3791)
05	Manufacturing: product-differentiated	SIC3 in (306, 307, 308, 311, 312, 319, 336, 338, 339, 377, 393) or SIC4 in (3243, 3244, 3311, 3321, 3331)
06	Manufacturing: science-based	SIC3 in (335, 337, 374, 375, 376) or SIC4 in (3211, 3341, 3792, 3799, 3911, 3912, 3913, 3914)
07	Construction	SIC3 in (400 - 449)
08	Transportation and storage; wholesale trade	SIC3 in (450 - 479; 500 - 599)
09	Communications and other utilities	SIC3 in (480 - 499)
10	Retail trade and commercial services	SIC3 in (600 - 692; 910 - 999)
11	Finance and insurance	SIC3 in (700 - 749)
12	Real estate operations and insurance agents	SIC3 in (750 - 761)
13	Business services	SIC3 in (770 - 779)
14	Education and health services	SIC3 in (850 - 869)

Industrial activity excluded from the WES	3-digit SIC80 codes associated with the excluded industries
Agriculture and related services industries	SIC3 in (010 - 017; 020 - 023)
Fishing and trapping industries	SIC3 in (030 - 033)
Federal government services	SIC2 = 81
Public administration	SIC3 in (810 - 837)
International and other extra-territorial government service industries	SIC3 = 841
Private households	SIC3 = 974
Religious organizations	SIC3 = 981

Appendix C — Geographic Region Definitions

WES region code	Region description	2-digit province codes included in the region
01	Atlantic	10, 11, 12, and 13
02	Quebec	24
03	Ontario	35
04	Manitoba and Saskatchewan	46 and 47
05	Alberta	48
06	British Columbia	59

Geographic regions excluded from the WES	2-digit province code
Yukon Territory	60
Northwest Territories	61



The Workplace and Employee Survey

The Workplace and Employee Survey (WES) is the first Statistics Canada program to simultaneously survey employers and workers. WES is intended to study how companies respond to economic and technological change, most notably in their human resource policies. For employees, WES is focused on activities in the workplace and how they relate to pay and job stability.

This report is meant to highlight some of the new data collected in a WES pilot conducted in 1996. Here's a sampling of the findings.

- Re-engineering has been the most pervasive form of reorganization in recent years.
- Establishments that invest heavily in new technologies are no more likely to downsize their workforce than other employers.
- Firms involved in innovative activities tend to employ better educated workers, pay them higher salaries, provide them with more training and retain them longer than non innovative firms.
- Workers rely more on informal and self-training than employer-provided formal training when learning new computer applications.
- Both hiring and separations are greater in low-tech sectors and less-skilled jobs. High-tech workplaces tend to generate stable jobs.

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